



CTK Co., Ltd.
The Power Leader of Global Regulatory Compliance

CTK Co., Ltd.

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RF EXPOSURE EVALUATION

Applicant : Samsung Electronics Co., Ltd.

Applicant Address : 129, Samsung-ro Yeongtong-gu, Suwon-si,
Gyeonggi-do, Korea, 16677

Kind of Product : WLAN Access Point

**Equipment
model name** : WEA412h

Antenna type : PCB antenna

*** Antenna Gain** : 3.38 dBi(Ant1), 2.89 dBi(Ant2) @2.4GHz
5.73 dBi(Ant1), 4.85 dBi(Ant2) @5GHz

**** MPE Calculations ****

The EUT will only be used with a separation of 50 centimeters or greater between the antenna and the body of the user. The MPE calculation for this exposure is shown below.

The peak radiated output power (EIRP) is calculated as follows:

EIRP = P + G	Where, P = Power input to the antenna (mW) G = Power gain of the antenna (dBi)
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The numeric gain(G) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

Power density at the specific separation:

$S = PG / (4R^2\pi)$	Where, S = Maximum power density (mW/cm ²) P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (50cm = limit for MPE)
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The Maximum permissible exposure (MPE) for the general population is 1 mW/cm².
The power density at 50cm does not exceed the 1 mW/cm² limit.

Estimated safe separation:

$R = \sqrt{(PG / 4\pi)}$	Where, P = Power input to the antenna (mW) G = Numeric power gain of the antenna R = Distance to the center of the radiation of the antenna (50cm = limit for MPE)
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ANT : A1 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11b	18.36	68.55	3.38	0.0297	3.45
802.11g	15.86	38.55		0.0167	2.58
802.11n HT20	15.58	36.14		0.0157	2.50

ANT : A2 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	14.68	29.38	2.89	0.0114	2.13
802.11n HT20	13.78	23.88		0.0092	1.92

ANT : A1+A2 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11n HT20	17.78	59.98	6.15	0.0492	4.44

ANT : A1 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	16.31	42.76	5.73	0.0318	3.57
802.11n_HT20	16.29	42.56		0.0317	3.56
802.11n HT40	15.87	38.64		0.0288	3.39
802.11ac_VHT20	16.52	44.87		0.0334	3.66
802.11ac VHT40	15.99	39.72		0.0296	3.44
802.11ac VHT80	13.81	24.04		0.0179	2.68

ANT : A2 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	15.89	38.82	4.85	0.0236	3.07
802.11n_HT20	15.71	37.24		0.0226	3.01
802.11n HT40	16.13	41.02		0.0249	3.16
802.11ac_VHT20	16.08	40.55		0.0246	3.14
802.11ac VHT40	16.15	41.21		0.0250	3.17
802.11ac VHT80	14.02	25.23		0.0153	2.48



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ANT : A1+A2 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	19.11	81.47	8.32	0.1101	6.64
802.11n_HT20	19.02	79.80		0.0159	2.52
802.11n_HT40	19.01	79.62		0.0158	2.52
802.11ac_VHT20	19.29	84.92		0.0169	2.60
802.11ac_VHT40	19.08	80.91		0.0161	2.54
802.11ac_VHT80	16.97	49.77		0.0099	1.99

Multiple chain transmitters (2.4 GHz + 5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	EIRP (mW)	S (mW/cm ²)	R (cm)
A1+A2 (5 GHz)	19.29	84.92	8.32	576.77		
A1+A2 (2.4 GHz)	17.78	59.98	6.15	247.17		
Combined				823.94	0.1639	8.10