



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

CTK Co., Ltd.

386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
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RF EXPOSURE EVALUATION

Applicant : Samsung Electronics Co., Ltd.

Applicant Address : 129, Samsung-ro Yeongtong-gu, Suwon-si,
Gyeonggi-do, Korea, 443-742

Kind of Product : WLAN Access Point

**Equipment
model name** : WEA403e

Antenna type : Patch antenna (Worst Case)

Antenna Gain : 6.5 dBi @2.4GHz, 7 dBi @5GHz (Patch)

* * MPE Calculations * *

The EUT will only be used with a separation of 20 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:

$\text{EIRP} = P + G$	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/cm²) 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 (20cm = limit for MPE)
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The Maximum permissible exposure (MPE) for the general population is 1 mW/cm².

The power density at 20cm 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 (20cm = 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	15.38	34.51	6.5	0.0307	3.50
802.11g	12.14	16.37		0.0145	2.41
802.11n HT20	12.20	16.60		0.0147	2.43

ANT : A2 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	11.21	13.21	6.5	0.0117	2.17
802.11n HT20	11.18	13.12		0.0117	2.16

ANT : A3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	11.70	14.79	6.5	0.0131	2.29
802.11n HT20	11.61	14.49		0.0129	2.27

ANT : A1+A2+A3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	16.47	44.36	11.27	0.1182	6.88
802.11n HT20	16.45	44.16		0.1177	6.86

ANT : M1 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	11.68	14.72	6.5	0.0131	2.29

ANT : M2 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	11.56	14.32	6.5	0.0127	2.26



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ANT : M3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	12.22	16.67	6.5	0.0148	2.43

ANT : M1+M2+M3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	16.56	45.29	11.27	0.1207	6.95

ANT : A1 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	8.87	7.71	7.0	0.0077	1.75
802.11n_HT20	8.84	7.66		0.0076	1.75
802.11n HT40	8.79	7.57		0.0075	1.74
802.11ac_VHT20	8.79	7.57		0.0075	1.74
802.11ac VHT40	8.91	7.78		0.0078	1.76
802.11ac VHT80	8.92	7.80		0.0078	1.76

ANT : A2 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	8.31	6.78	7.0	0.0068	1.64
802.11n_HT20	8.26	6.70		0.0067	1.63
802.11n HT40	8.36	6.85		0.0068	1.65
802.11ac_VHT20	8.21	6.62		0.0066	1.63
802.11ac VHT40	8.33	6.81		0.0068	1.65
802.11ac VHT80	8.20	6.61		0.0066	1.62



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ANT : A3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	8.24	6.67	7.0	0.0066	1.63
802.11n_HT20	8.14	6.52		0.0065	1.61
802.11n HT40	8.14	6.52		0.0065	1.61
802.11ac_VHT20	8.31	6.78		0.0068	1.64
802.11ac VHT40	8.03	6.35		0.0063	1.59
802.11ac VHT80	8.26	6.70		0.0067	1.63

ANT : A1+A2+A3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	13.24	21.09	11.77	0.0631	5.02
802.11n_HT20	13.20	20.89		0.0625	5.00
802.11n HT40	13.12	20.51		0.0613	4.95
802.11ac_VHT20	13.22	20.99		0.0628	5.01
802.11ac VHT40	13.08	20.32		0.0608	4.93
802.11ac VHT80	13.15	20.65		0.0618	4.97

ANT : M1 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	8.99	7.93	7.0	0.0079	1.78

ANT : M2 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	9.05	8.04	7.0	0.0080	1.79

ANT : M3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	9.58	9.08	7.0	0.0091	1.90



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ANT : M1+M2+M3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	13.99	25.06	11.77	0.0749	5.48

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+A3(5 GHz)	13.22	20.99	11.77	315.50		
A1+A2+A3 (2.4 GHz)	16.47	44.36	11.27	594.29		
Combined				909.790	0.1810	8.51