



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

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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea
Tel: +82-31-339-9970 Fax: +82-31-624-9501
www.e-ctk.com

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** : WEA463e

Antenna type : Dipole / Patch antenna

*** Antenna Gain** : 1. WDS-ANTD5U : 4 dBi @2.4GHz, 8 dBi @5GHz (Dipole)
2. WDS-ANTP6U : 6.5 dBi @2.4GHz, 7 dBi @5GHz (Patch_1)
3. WDS-AT2(5)P12 : 13.203 dBi @2.4GHz, 13.138 dBi @5GHz (Patch_2)

* Worst case is WDS-AT2(5)P12. So the worst data of WDS-AT2(5)P12 are shown.



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** 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:

$EIRP = P + G$	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 (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	10.47	11.14	13.203	0.0463	4.31
802.11g	12.10	16.22		0.0675	5.19
802.11n HT20	11.22	13.24		0.0551	4.69

ANT : A2 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	11.83	15.24	13.203	0.0634	5.04
802.11n HT20	11.15	13.03		0.0542	4.66

ANT : A3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	12.42	17.46	13.203	0.0726	5.39
802.11n HT20	11.53	14.22		0.0592	4.86

ANT : A1+A2+A3 (2.4 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11g	16.84	48.31	17.974	0.6027	15.53
802.11n HT20	16.03	40.09		0.5002	14.14



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ANT : A1 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	4.31	2.70	13.138	0.0111	2.10
802.11n_HT20	4.47	2.80		0.0115	2.14
802.11n HT40	6.08	4.06		0.0166	2.58
802.11ac_VHT20	4.45	2.79		0.0114	2.14
802.11ac VHT40	6.16	4.13		0.0169	2.60
802.11ac VHT80	5.61	3.64		0.0149	2.44

ANT : A2 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	3.26	2.12	13.138	0.0087	1.86
802.11n_HT20	3.61	2.30		0.0094	1.94
802.11n HT40	5.26	3.36		0.0138	2.35
802.11ac_VHT20	3.52	2.25		0.0092	1.92
802.11ac VHT40	5.19	3.30		0.0135	2.33
802.11ac VHT80	4.97	3.14		0.0129	2.27

ANT : A3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	4.40	2.75	13.138	0.0113	2.12
802.11n_HT20	4.68	2.94		0.0120	2.19
802.11n HT40	6.52	4.49		0.0184	2.71
802.11ac_VHT20	4.60	2.88		0.0118	2.17
802.11ac VHT40	6.49	4.46		0.0183	2.70
802.11ac VHT80	5.84	3.84		0.0157	2.51



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ANT : A1+A2+A3 (5 GHz)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	R (cm)
802.11a	8.46	7.01	17.909	0.0862	5.87
802.11n_HT20	8.70	7.41		0.0911	6.04
802.11n HT40	10.64	11.59		0.1424	7.55
802.11ac_VHT20	8.67	7.36		0.0905	6.02
802.11ac VHT40	10.58	11.43		0.1405	7.50
802.11ac VHT80	10.26	10.62		0.1305	7.23

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)	10.64	11.59	17.909	715.98		
A1+A2+A3 (2.4 GHz)	16.84	48.31	17.974	3029.70		
Combined				3745.68	0.7452	17.26