



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

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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 : WEA554i/WEA554d

Antenna type : OMNI Antenna(ANT 0, 1, 2, 3),
Directional Antenna(ANT 0, 1, 2, 3)

***Antenna Gain**

		OMNI Antenna	Directional Antenna
2.4GHz	ANT 0	2.49 dBi	6.72 dBi
	ANT 1	3.57 dBi	6.97 dBi
	ANT 2	3.16 dBi	6.63 dBi
	ANT 3	2.43 dBi	6.87 dBi
5GHz	ANT 0	3.49 dBi	7.91 dBi
	ANT 1	4.53 dBi	7.89 dBi
	ANT 2	3.90 dBi	7.85 dBi
	ANT 3	3.78 dBi	7.93 dBi
BLE	ANT	3.28 dBi	-



Standard Requirement

The following RF exposure procedures are applicable :

Part 1.1310 Radiofrequency radiation exposure limits

Part 2.1091 Radiofrequency radiation exposure evaluation : Mobile device

Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
300-1,500			f/1500	30
1,500-100,000			1.0	30

*f = frequency in MHz * = Plane-wave equivalent power density*



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** 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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WLAN 2.4 GHz

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	Limit (mW/cm ²)
ANT0	16.95	49.55	6.72	0.0463	1
ANT1	16.68	46.56	6.97	0.0461	
ANT2	16.43	43.95	6.63	0.0402	
ANT3	16.73	47.10	6.87	0.0456	

WLAN 5 GHz

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	Limit (mW/cm ²)
ANT0	17.92	61.94	7.91	0.0762	1
ANT1	17.61	57.68	7.89	0.0706	
ANT2	18.36	68.55	7.85	0.0831	
ANT3	17.79	60.12	7.93	0.1537	

BLE

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	Limit (mW/cm ²)
BLE	7.14	5.18	3.28	0.0022	1

Multiple chain transmitters (2.4 GHz + 5 GHz + BLE)

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm ²)	Limit (mW/cm ²)
Combined	-	-	-	0.564	1