



CTK Co., Ltd.  
The First 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, 16677 Republic of Korea

**Kind of Product** : Wi-Fi Transceiver

**Equipment  
model name** : WDN220M

**FCC ID** : A3LWDN220M

**Certification  
Number IC** : 649E-WDN220M

**Antenna type** : Metal Antenna

**Antenna Gain** : ANT0 : 1.83 dBi, ANT1 : 1.67 dBi



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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 <sup>2</sup> ) 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/cm<sup>2</sup> .

The power density at 20cm does not exceed the 1 mW/cm<sup>2</sup> 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 : Single Streams

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm <sup>2</sup> )	R (cm)
802.11b	19.50	89.13	1.83	<b>0.0270</b>	20
802.11g	18.65	73.28		<b>0.0222</b>	
802.11n HT20	18.26	66.99		<b>0.0203</b>	
802.11n HT40	16.30	42.66		<b>0.0129</b>	

## ANT : 2 Spatial Streams

Mode	P (dBm)	P (mW)	G (dBi)	S (mW/cm <sup>2</sup> )	R (cm)
802.11g	21.42	138.68	4.76	<b>0.0826</b>	20
802.11n HT20	20.98	125.31		<b>0.0746</b>	
802.11n HT40	19.30	85.11		<b>0.0507</b>	