



CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17142, Korea

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RF EXPOSURE EVALUATION

Applicant : Samsung Electronics Co Ltd

Applicant Address : 19 Chapin Rd, Building D. Pine Brook, New Jersey, United States

Kind of Product : Wi-Fi/BT Transceiver

Equipment model name : WCHA31M

FCC ID : A3LWCHA31M



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Standard Requirement

The following RF exposure procedures are applicable :

- FCC Rules
Part 1.1310 Radiofrequency radiation exposure limits

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			<u>1.0</u>	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 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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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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RF Exposure Results

Mode	Measured Max Output Power (dBm)	G (dBi)	Power tolerance (dB)	P (dBm)	P (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	R (cm)
BLE	7.525	1.280	+2	10.805	12.036	0.0024	1.000	20
WLAN 5 GHz	19.770	0.730	+2	22.500	177.828	0.0354		
WLAN 6 GHz	19.390	1.900	+2	23.290	213.304	0.0424		

Simultaneous transmitter

Mode	MPE ratios**	Limit
BLE	0.0024	-
WLAN 5 GHz	0.0354	
WLAN 6 GHz	0.0424	
Combined	0.0802	1

**MPE ratios = MPE/MPE limit at each frequency