



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

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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** : WCB940M, WCB941M

FCC ID : A3LWCB940M



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			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density



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

<WCB940M>

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²)	R (cm)
BT	12.673	-1.04	11.63	14.56	0.0029	20
BLE	12.518	-1.04	11.48	14.05	0.0028	
WLAN 2.4 GHz	21.010	1.08	22.09	161.81	0.0322	
WLAN 5 GHz	21.510	3.88	25.39	345.94	0.0688	
WLAN 6E	11.49	2.94	14.43	27.73	0.0055	

Multiple chain transmitters

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²)	R (cm)
BT (Worst Case)	12.673	-1.04	11.63	14.56	/	20
WLAN 2.4 GHz	21.010	1.08	22.09	161.81		
WLAN 5 GHz	21.510	3.88	25.39	345.94		
WLAN 6E	11.49	2.94	14.43	27.73		
Combined				550.045	0.1094	



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<WCB941M>

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²)	R (cm)
BT	12.886	-1.38	11.51	14.14	0.0028	20
BLE	12.767	-1.61	11.16	13.05	0.0026	
WLAN 2.4 GHz	21.500	-1.19	20.31	107.40	0.0214	
WLAN 5 GHz	21.510	2.95	24.46	279.25	0.0556	
WLAN 6E	11.490	2.21	13.70	23.44	0.0047	

Multiple chain transmitters

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²)	R (cm)
BT (Worst Case)	12.886	-1.38	11.51	14.14	/	20
WLAN 2.4 GHz	21.500	-1.19	20.31	107.40		
WLAN 5 GHz	21.510	2.95	24.46	279.25		
WLAN 6E	11.490	2.21	13.70	23.44		
Combined				495.636	0.0986	