



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

## **CTK Co., Ltd.**

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 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** : 19 Chapin Rd, Building D. Pine Brook, New Jersey,  
United States

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

**Equipment  
model name** : WCA942M, WCA943M

**FCC ID** : A3LWCA942M



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

# CTK Co., Ltd.

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

## 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			<b>1.0</b>	30

*f* = frequency in MHz

\* = Plane-wave equivalent power density



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

# CTK Co., Ltd.

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

## 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)
----------------	--

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)
----------------------	---

## 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)
--------------------------	--



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

# CTK Co., Ltd.

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

## RF Exposure Results

### <WCA942M>

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm <sup>2</sup> )	R (cm)
BT	12.673	-1.04	11.63	14.56	<b>0.0029</b>	20
BLE	12.518	-1.04	11.48	14.05	<b>0.0028</b>	
WLAN 2.4 GHz	17.580	1.69	19.27	84.53	<b>0.0168</b>	
WLAN 5 GHz	21.510	3.88	25.39	345.94	<b>0.0688</b>	
WLAN 6E	11.49	2.94	14.43	27.73	<b>0.0055</b>	

### Multiple chain transmitters

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm <sup>2</sup> )	R (cm)
BT (Worst Case)	12.673	-1.04	11.63	14.56	/	20
WLAN 2.4 GHz	17.580	1.69	19.27	84.53		
WLAN 5 GHz	21.510	3.88	25.39	345.94		
WLAN 6E	11.49	2.94	14.43	27.73		
Combined	/	/	/	472.76	<b>0.0940</b>	



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

# CTK Co., Ltd.

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

## <WCA943M>

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm <sup>2</sup> )	R (cm)
BT	12.886	-1.38	11.51	14.14	<b>0.0028</b>	20
BLE	12.767	-1.61	11.16	13.05	<b>0.0026</b>	
WLAN 2.4 GHz	17.580	3.10	20.68	116.95	<b>0.0233</b>	
WLAN 5 GHz	21.510	2.95	24.46	279.25	<b>0.0556</b>	
WLAN 6E	11.49	2.21	13.70	23.44	<b>0.0047</b>	

## Multiple chain transmitters

Mode	P (dBm)	G (dBi)	EIRP (dBm)	EIRP (mW)	Power Density		R (cm)
					FCC (mW/cm <sup>2</sup> )	ISED (W/m <sup>2</sup> )	
BT (Worst Case)	12.886	-1.38	11.51	14.14	/		20
WLAN 2.4 GHz	17.580	3.10	20.68	116.95			
WLAN 5 GHz	21.510	2.95	24.46	279.25			
WLAN 6E	11.49	2.21	13.70	23.44			
Combined				433.78			