

Maximum Permissive Exposure

FCC ID: A3LWCHB41M

Product Name: Wi-Fi/BT/Zigbee Transceiver

Model No: WCHB41M

According to FCC CFR 47 §1.1310, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b).

Table 1 Limits for Maximum Permissible Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits For Occupational / Control Exposures (f = frequency)				
30-300	61.4	0.163	1.0	6
300-1500	...	...	f/300	6
1500-100,000	...	...	5.0	6
(B) Limits For General Population / Uncontrolled Exposure (f = frequency)				
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

Sony Group Corporation declares that the product described above has been evaluated and found to comply with the RF exposure limits for humans, as specified based on ANSI/FCC recommendation.

Mode	Max Output Power (dBm)	Tune-up factor	Tune-up max power (dBm)
BT	13.08	1.236	14.0
Zigbee	19.90	1.148	20.5
Wireless 2.4G	26.93	1.140	27.5
Wireless 5G	20.07	1.239	21.0
Wireless 6G	12.18	1.208	13.0

**The value presented in the MPE is the maximum tune-up power.

1. MPE Calculation

● BT MPE

Based on safety distance (r) **20cm**, the antenna gain (G) is **1.125Numerical**, and the highest power output (P) is **25.119mW**, the power density (S) is **0.005622mW/cm²**.

RF Exposure Calculations:

$$S = (P * G) / (4 * \pi * r^2) \text{ or } r = \sqrt{(P * G) / (4 * \pi * S)}$$

Where :

Based on safety distance (r)=	20 cm
Highest Power Output (P)=	14.0 dBm = 25.119 mW
Antenna Gain (G)=	0.51 dBi = 1.125 Numerical
MPE (S) = (P*G) / (4*π*r ²) =	= (33.884*0.605)/(4*π*20²)= 0.005622 mW/cm²

- Zigbee MPE

Based on safety distance (r) **20cm**, the antenna gain (G) is **1.125Numerical**, and the highest power output (P) is **112.202mW**, the power density (S) is **0.025112mW/cm²**.

RF Exposure Calculations:

$$S = (P * G) / (4 * \pi * r^2) \text{ or } r = \sqrt{(P * G) / (4 * \pi * S)}$$

Where :

Based on safety distance (r)=	20 cm
Highest Power Output (P)=	20.5 dBm = 112.202 mW
Antenna Gain (G)=	0.51 dBi = 1.125 Numerical
MPE (S) = (P*G) / (4* π *r ²) =	= (33.884*0.605)/(4*π*20²)= 0.025112 mW/cm²

- Wireless 2.4G MPE

Based on safety distance (r) **20cm**, the antenna gain (G) is **0.916Numerical**, and the highest power output (P) is **562.341mW**, the power density (S) is **0.102477mW/cm²**.

RF Exposure Calculations:

$$S = (P * G) / (4 * \pi * r^2) \text{ or } r = \sqrt{(P * G) / (4 * \pi * S)}$$

Where :

Based on safety distance (r)=	20 cm
Highest Power Output (P)=	27.5 dBm = 562.341 mW
Antenna Gain (G)=	-0.38 dBi = 0.916 Numerical
MPE (S) = (P*G) / (4* π *r ²) =	= (1000.000*1.164)/(4*π*20²)= 0.102477 mW/cm²

- Wireless 5G MPE

Based on safety distance (r) **20cm**, the antenna gain (G) is **1.045Numerical**, and the highest power output (P) is **125.893mW**, the power density (S) is **0.026173mW/cm²**.

RF Exposure Calculations:

$$S = (P * G) / (4 * \pi * r^2) \text{ or } r = \sqrt{(P * G) / (4 * \pi * S)}$$

Where :

Based on safety distance (r)=	20 cm
Highest Power Output (P)=	21.0 dBm = 125.893 mW
Antenna Gain (G)=	0.19 dBi = 1.045 Numerical
MPE (S) = (P*G) / (4* π *r ²) =	= (199.526*1.429)/(4*π*20²)= 0.026173 mW/cm²

- Wireless 6G MPE

Based on safety distance (r) **20cm**, the antenna gain (G) is **1.089Numerical**, and the highest power output (P) is **19.953mW**, the power density (S) is **0.004323mW/cm²**.

RF Exposure Calculations:

$$S = (P * G) / (4 * \pi * r^2) \text{ or } r = \sqrt{(P * G) / (4 * \pi * S)}$$

Where :

Based on safety distance (r)=	20 cm
Highest Power Output (P)=	13.0 dBm = 19.953 mW
Antenna Gain (G)=	0.37 dBi = 1.089 Numerical
MPE (S) = (P*G) / (4* π *r ²) =	= (16.982*1.084)/(4*π*20²)= 0.004323 mW/cm²

2. MPE Calculation for Simultaneous

MPE			
BT (mW/cm ²)	Wireless 2.4G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.005622	0.102477	0.108099	≤ 1

MPE			
BT (mW/cm ²)	Wireless 5G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.005622	0.026173	0.031795	≤ 1

MPE			
BT (mW/cm ²)	Wireless 6G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.005622	0.004323	0.009945	≤ 1

MPE			
BT (mW/cm ²)	Zigbee (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.005622	0.025112	0.030734	≤ 1

MPE			
Zigbee (mW/cm ²)	Wireless 2.4G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.025112	0.102477	0.127589	≤ 1

MPE			
Zigbee (mW/cm ²)	Wireless 5G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.025112	0.026173	0.051285	≤ 1

MPE			
Zigbee (mW/cm ²)	Wireless 6G (mW/cm ²)	Total (mW/cm ²)	Limit (mW/cm ²)
0.025112	0.004323	0.029435	≤ 1

Sincerely Yours,

Johnny Hsueh

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