

# MPE Calculations : (WLAN: 802.11b)

- Frequency range : 2412 MHz ~ 2462 MHz
- Measured output power : 17.25 dBm
- Target Power & Tolerance : 17.00 dBm  $\pm$  1.5 dB ( Max. 18.5 dBm & Min. 15.5 dBm )
- Maximum antenna peak gain : 2.46 dBi
- **Maximum output power for the calculation : 18.50 dBm**

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the device. The MPE calculation for this exposure is shown below.

$  \begin{aligned}  \text{▪ EIRP} &= P + G \\  &= 18.50 \text{ dBm} + 2.46 \text{ dBi} \\  &= \mathbf{20.96 \text{ dBm} = 124.739 \text{ mW}}  \end{aligned}  $	<b>- Note</b> P = Power input to the antenna(dBm) G = Power gain of the antenna(dBi)
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## - Power density at the specific separation

$  \begin{aligned}  \text{▪ S} &= \text{EIRP} / ( 4 R^2 \pi ) \\  &= \mathbf{124.739} / ( 4 \times 20^2 \times \pi ) \\  &= \mathbf{0.024817} \text{ mW/cm}^2  \end{aligned}  $	<b>- Note</b> S = Maximum power density(mW/cm <sup>2</sup> ) EIRP = Equivalent Isotropic Radiated Power(mW) R = Distance to the center of the radiation of the antenna(20cm)
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## Conclusion : The exposure condition of this device is compliant with FCC rules.

The maximum permissible exposure(MPE) of the general population/Uncontrolled for this device is 1.0 mW/cm<sup>2</sup>.

# MPE Calculations : (WLAN: 802.11g)

- Frequency range : 2412 MHz ~ 2462 MHz
- Measured output power : 20.42 dBm
- Target Power & Tolerance : 20.50 dBm  $\pm$  1.5 dB ( Max. 22 dBm & Min. 19 dBm )
- Maximum antenna peak gain : 2.46 dBi
- **Maximum output power for the calculation : 22.00 dBm**

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the device. The MPE calculation for this exposure is shown below.

$  \begin{aligned}  \text{▪ EIRP} &= P + G \\  &= 22.00 \text{ dBm} + 2.46 \text{ dBi} \\  &= \mathbf{24.46 \text{ dBm} = 279.255 \text{ mW}}  \end{aligned}  $	<b>- Note</b> P = Power input to the antenna(dBm) G = Power gain of the antenna(dBi)
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## - Power density at the specific separation

$  \begin{aligned}  \text{▪ S} &= \text{EIRP} / ( 4 R^2 \pi ) \\  &= \mathbf{279.255} / ( 4 \times 20^2 \times \pi ) \\  &= \mathbf{0.055557 \text{ mW/cm}^2}  \end{aligned}  $	<b>- Note</b> S = Maximum power density(mW/cm <sup>2</sup> ) EIRP = Equivalent Isotropic Radiated Power(mW) R = Distance to the center of the radiation of the antenna(20cm)
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## Conclusion : The exposure condition of this device is compliant with FCC rules.

The maximum permissible exposure(MPE) of the general population/Uncontrolled for this device is 1.0 mW/cm<sup>2</sup>.

# MPE Calculations : (WLAN: 802.11n HT20)

- Frequency range : 2412 MHz ~ 2462 MHz
- Measured output power : 20.84 dBm
- Target Power & Tolerance : 21.00 dBm  $\pm$  1.5 dB ( Max. 22.5 dBm & Min. 19.5 dBm )
- Maximum antenna peak gain : 2.46 dBi
- **Maximum output power for the calculation : 22.50 dBm**

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the device. The MPE calculation for this exposure is shown below.

$  \begin{aligned}  \text{▪ EIRP} &= P + G \\  &= 22.50 \text{ dBm} + 2.46 \text{ dBi} \\  &= \mathbf{24.96 \text{ dBm} = 313.329 \text{ mW}}  \end{aligned}  $	<b>- Note</b> P = Power input to the antenna(dBm) G = Power gain of the antenna(dBi)
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## - Power density at the specific separation

$  \begin{aligned}  \text{▪ S} &= \text{EIRP} / ( 4 R^2 \pi ) \\  &= \mathbf{313.329} / ( 4 \times 20^2 \times \pi ) \\  &= \mathbf{0.062335 \text{ mW/cm}^2}  \end{aligned}  $	<b>- Note</b> S = Maximum power density(mW/cm <sup>2</sup> ) EIRP = Equivalent Isotropic Radiated Power(mW) R = Distance to the center of the radiation of the antenna(20cm)
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## Conclusion : The exposure condition of this device is compliant with FCC rules.

The maximum permissible exposure(MPE) of the general population/Uncontrolled for this device is 1.0 mW/cm<sup>2</sup>.

# MPE Calculations : (Bluetooth)

- Frequency range : 2402 MHz ~ 2480 MHz
- Measured output power : 4.27 dBm
- Target Power & Tolerance : 3.00 dBm  $\pm$  1.5 dB ( Max. 4.5 dBm & Min. 1.5 dBm )
- Maximum antenna peak gain : 0.77 dBi
- **Maximum output power for the calculation : 4.50 dBm**

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the device. The MPE calculation for this exposure is shown below.

$  \begin{aligned}  \text{▪ EIRP} &= P + G \\  &= 4.50 \text{ dBm} + 0.77 \text{ dBi} \\  &= \text{5.27 dBm} = \text{3.366 mW}  \end{aligned}  $	<b>- Note</b> P = Power input to the antenna(dBm) G = Power gain of the antenna(dBi)
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## - Power density at the specific separation

$  \begin{aligned}  \text{▪ S} &= \text{EIRP} / ( 4 R^2 \pi ) \\  &= 3.366 / ( 4 \times 20^2 \times \pi ) \\  &= \text{0.000670 mW/cm}^2  \end{aligned}  $	<b>- Note</b> S = Maximum power density(mW/cm <sup>2</sup> ) EIRP = Equivalent Isotropic Radiated Power(mW) R = Distance to the center of the radiation of the antenna(20cm)
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## Conclusion : The exposure condition of this device is compliant with FCC rules.

The maximum permissible exposure(MPE) of the general population/Uncontrolled for this device is 1.0 mW/cm<sup>2</sup>.

# RF Exposure Compliance for simultaneous operations

- **Configurations for simultaneous operations**

- **Configuration 1:** 2.4GHz WLAN + Bluetooth

- **Result**

RF function	802.11b	802.11g	802.11n (HT20)	BT	Total Power Density (mW/cm <sup>2</sup> )
MODE	2.4GHz	2.4GHz	2.4GHz	2.4GHz	
Power Density (mW/cm <sup>2</sup> )	<b>0.024817</b>	0.055557	0.062335	<b>0.00067</b>	
Configuration 1	<b>0.024817</b>			<b>0.00067</b>	<b>0.025487</b>

Note 1: The maximum power density in each RF function was used for above table.