#### **RF Exposure / MPE Calculation**

No.	14854382S
Customer	Murata Manufacturing Co., Ltd.
Description of EUT	Communication Module
Model Number of EUT	2CX
FCC ID	VPYLBEE5QG2CX

Murata Manufacturing Co., Ltd. declares that Model: 2CX complies with FCC radiation exposure requirement specified in the FCC Rule 2.1091 (for mobile).

#### **RF Exposure Calculations:**

The following information provides the minimum separation distance for the highest gain antenna provided with the "2CX" as calculated from (B) Limits for General Population / Uncontrolled Exposure of TABLE 1- LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) of §1.1310 Radiofrequency radiation exposure limits.

## [Bluetooth Low Energy part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm^2 uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$

Where

P = 9.66 mW (Maximum average output power)

Time average was used for the above value in consideration of 6-minutes time-averaging

☑ Burst power average was used for the above value in consideration of worst condition.

G = 0.948 Numerical Antenna gain; equal to -0.23 dBi

r = 20 cm (Separation distance)

Power Density Result S = 0.00182 mW/cm<sup>2</sup>

## [Bluetooth (BR/EDR) part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm^2 uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$
 Where 
$$P = 7.59 \text{ mW (Maximum average output power)}$$
 
$$\blacksquare \text{ Time average was used for the above value in consideration of 6-minutes time-averaging}$$
 
$$\blacksquare \text{ Burst power average was used for the above value in consideration of worst condition.}$$
 
$$G = 0.948 \text{ Numerical Antenna gain; equal to -0.23 dBi}$$
 
$$r = 20 \text{ cm (Separation distance)}$$

Power Density Result S = 0.00143 mW/cm<sup>2</sup>

# [WLAN 2.4 GHz band part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1 mW/cm<sup>2</sup> uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$
 Where 
$$P = 44.66 \text{ mW (Maximum average output power)}$$
 
$$\square \text{ Time average was used for the above value in consideration of 6-minutes time-averag}$$
 
$$\square \text{ Burst power average was used for the above value in consideration of worst condition.}$$
 
$$G = 1.462 \text{ Numerical Antenna gain; equal to 1.65 dBi}$$
 
$$r = 20 \text{ cm (Separation distance)}$$

Power Density Result S = 0.01299 mW/cm<sup>2</sup>

### [WLAN 5 GHz band part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm^2 uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$
 Where 
$$P = 28.00 \text{ mW (Maximum average output power)}$$
 
$$\square \text{ Time average was used for the above value in consideration of 6-minutes time-averaging}$$
 
$$\square \text{ Burst power average was used for the above value in consideration of worst condition.}$$
 
$$G = 1.297 \text{ Numerical Antenna gain; equal to 1.13 dBi}$$
 
$$r = 20 \text{ cm (Separation distance)}$$

Power Density Result S = 0.00723 mW/cm<sup>2</sup>

### WLAN 6 GHz band part]

This calculation is based on the highest EIRP possible from the system, considering maximum power and antenna gain, and considering a 1mW/cm^2 uncontrolled exposure limit. The Friis formula used was:

$$S = \frac{P \times G}{4 \times \pi \times r^2}$$
 Where 
$$P = 27.99 \text{ mW (Maximum average output power)}$$
 
$$\square \text{ Time average was used for the above value in consideration of 6-minutes time-averaging}$$
 
$$\square \text{ Burst power average was used for the above value in consideration of worst condition.}$$
 
$$G = 0.769 \text{ Numerical Antenna gain; equal to -1.14 dBi}$$
 
$$r = 20 \text{ cm (Separation distance)}$$

Power Density Result S = 0.00428 mW/cm<sup>2</sup>

Therefore, if WLAN (5 GHz band) and Bluetooth (BTLE) transmit simultaneously,

 $S = 0.00723 \text{ mW/cm}^2 + 0.00182 \text{ mW/cm}^2$ 

 $= 0.00905 \text{ mW/cm}^2$ 

Therefore, if WLAN (5 GHz band) and Bluetooth (BR/EDR) transmit simultaneously,

 $S = 0.00723 \text{ mW/cm}^2 + 0.00143 \text{ mW/cm}^2$ 

 $= 0.00866 \text{ mW/cm}^2$ 

Therefore, if WLAN (6 GHz band) and Bluetooth (BTLE) transmit simultaneously,

 $S = 0.00428 \text{ mW/cm}^2 + 0.00182 \text{ mW/cm}^2$ 

 $= 0.0061 \text{ mW/cm}^2$ 

Therefore, if WLAN (6 GHz band) and Bluetooth (BR/EDR) transmit simultaneously,

 $S = 0.00428 \text{ mW/cm}^2 + 0.00143 \text{ mW/cm}^2$ 

 $= 0.00571 \text{ mW/cm}^2$