RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

EUT Specification

EUT	Computing Box
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz (WALN) ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 19.13 dBm (0.08184mW) IEEE 802.11g mode: 22.07 dBm (0.16106mW) draft 802.11n 20 MHz Channel mode: 22.30 dBm (0.16982mW) draft 802.11n 40 MHz Channel mode: 21.42 dBm (0.13867mW)
Antenna gain (Max)	3.8dBi (including cable loss) (Numeric gain: 2.39)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is 22.30dBm (0.16982mW) at 2412MHz (with 2.39numeric antenna gain.)*
2. *For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*

EUT	Computing Box
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☒ Others Bluetooth: 2.402GHz ~ 2.480GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure *(S = 5mW/cm^2)* ☒ General Population/Uncontrolled exposure *(S=1mW/cm^2)*
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	-3.13 dBm (0.486mW)
Antenna gain (Max)	PCB Antenna / -3.3 dBi (Numeric gain: 0.468)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is –3.13dBm (0.486mW) at 2480MHz (with 0.468 numeric antenna gain.)*
2. *DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.*
3. *For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.*

EUT	Computing Box
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☒ Others: CDMA: 824.7 ~ 848.31 MHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure *(S = 5mW/cm^2)* ☒ General Population/Uncontrolled exposure *(S=1mW/cm^2)*
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	27.23 dBm (528.44mW)
Antenna gain (Max)	Dipole Antenna / 850 MHz: -2.5dBi (Numeric gain: 0.56)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A
Remark: *The maximum output power is 27.23 dBm (528.44mW) at 1851.15MHz (with 0.56 numeric antenna gain.)*	

EUT	Computing Box
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☒ Others: CDMA: 824.7 ~ 848.31 MHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure *(S = 5mW/cm^2)* ☒ General Population/Uncontrolled exposure *(S=1mW/cm^2)*
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	24.94 dBm (311.89mW)
Antenna gain (Max)	Dipole Antenna / 850 MHz: -2.5dBi (Numeric gain: 0.56)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation ☐ N/A
Remark: *The maximum output power is 24.94 dBm (311.89mW) at 848.31MHz (with 0.56 numeric antenna gain.)*	

WLAN Mode: Maximum Permissible Exposure
Test mode: draft 802.11n 20 MHz Channel mode

EUT output power = 169.8mW (Peak Power)

Numeric Antenna gain = 2.4

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

→ Power density = 0.081108 mW / cm^2

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.)

Bluetooth Mode: Maximum Permissible Exposure
Test mode: GFSK CH High Channel mode

EUT output power = 0.4864mW (Peak Power)

Numeric Antenna gain = 0.47

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

→ Power density = 0.0000453 mW / cm^2

CDMA Mode: Maximum Permissible Exposure

For CDMA: 824.7 ~ 848.31 MHz

EUT output power = 311.89mW

Numeric Antenna gain = 0.56

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

→ Power density = 0.0348 mW / cm²

For CDMA: 1851.25 ~ 1908.75 MHz

EUT output power = 276.69mW

Numeric Antenna gain = 1.83

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

→ Power density = 0.1008 mW / cm²

CONCULSION:

Both of eh modules can transmit simultaneously, the formula of calculated the MIP is

CPD1/LPD1+CPD2/LPD2+ etc.<1

CPD= Calculation Power density
LPD= limit of power density

Therefore, the worst-cast situation is 0.081108/1+0.0000453/1+0.0348/0.566+0.1008/1 = 0.243437, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.