APPENDIX I
RADIO FREQUENCY EXPOSURE

LIMIT

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 §15.247(i) and §1.1307(b)(1) of this chapter.

According to RSS-Gen §5.5, before equipment certification is granted, the applicable requirements of RSS-102 shall be met.

EUT Specification

EUT	802.11n 1x2 PCIe Minicard transceiver
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Bluetooth: 2.402GHz ~ 2.480 GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11b mode: 22.64 dBm IEEE 802.11g mode: 24.90 dBm IEEE 802.11n HT20 mode: 25.65 dBm IEEE 802.11n HT40 mode: 25.59 dBm
Antenna gain (Max)	3.62 dBi (Numeric gain: 2.30)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A
Remark: *1. The maximum output power is 25.59 dBm (362.64mW) at 2437MHz (with 2.30 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 maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*	

TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where *E = Field strength in Volts / meter*
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

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

Maximum Permissible Exposure

IEEE 802.11 g mode:

EUT output power = 309.02mW

Numeric Antenna gain = 2.30

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 = 0.141mW / cm²*

IEEE 802.11n HT20 mode:

EUT output power = 367.28mW

Numeric Antenna gain = 2.30

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 = 0.1681 mW / cm²*

IEEE 802.11n HT40 mode:

EUT output power = 362.64mW

Numeric Antenna gain = 2.30

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 = 0.1659mW / cm²*

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)