MPE Calculations

Systems operating under the provision of 47 CFR 1.1307(b)(1) shall be operated in a manor that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines.

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b). The MPE calculation for this exposure is shown below.

Using the Antennas with highest output power:

The peak radiated output power (EIRP) is calculated as follows:

Antenna	Frequency (GHz)	Power input to the antenna (P) (dBm)	Power gain of the antenna (G) (dBi)	EIRP (P+G) (dBm)	EIRP $Log^{-1(dBm/10)}$ (mW)
Wistron NeWeb Corp. (Chain A)	2.4	23.83	4.96	28.79	756.83
Wistron NeWeb Corp. (Chain A)	5	20.91	4.87	25.78	378.44
Wistron NeWeb Corp. (Chain B)	2.4	23.63	4.96	28.59	722.77
Wistron NeWeb Corp. (Chain B)	5	20.61	4.87	25.48	353.18

EIRP = P + G
Where
P = Power input to the antenna (mW).
G = Power gain of the antenna (dBi)

The numeric gain (G) of the antenna with a gain specified in dB is determined by:

Antenna	Frequency (GHz)	Antenna Gain (G) (dBi)	Numeric Antenna Gain $Log^{-1(dBm/10)}$ (dB)
Wistron NeWeb Corp. (Chain A)	2.4	4.96	3.13
Wistron NeWeb Corp. (Chain A)	5	4.87	3.07
Wistron NeWeb Corp. (Chain B)	2.4	4.96	3.13
Wistron NeWeb Corp. (Chain B)	5	4.87	3.07

G = Log^{-1} (dB antenna gain/10)

Power density at the specific separation:

Antenna	Frequency (GHz)	Power input to the antenna (P) (mW)	Numeric Power Gain of the Antenna (G) (dB)	Maximum Power Spectral Density $S=PG/(4R^2\pi)$ (mW/cm^2)	Maximum Power Spectral Density Limit (mW/cm^2)
Wistron NeWeb Corp. (Chain A)	2.4	241.55	3.13	0.151	1.00
Wistron NeWeb Corp. (Chain A)	5	123.31	3.07	0.075	1.00
Wistron NeWeb Corp. (Chain B)	2.4	230.67	3.13	0.144	1.00
Wistron NeWeb Corp. (Chain B)	5	115.08	3.07	0.070	1.00

$S = PG/(4R^2\pi)$
Where
S = Maximum power density (mW/cm^2)
P = Power input to the antenna (mW).
G = Numeric power gain of the antenna
R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)

The maximum permissible exposure (MPE) for the general population is 1mW/cm^2.

The power density at 20cm does not exceed the 1mW/cm^2 limit. Therefore, the exposure condition is compliant with FCC rules.