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.

<u>Using the Antennas with highest output power:</u>

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)
Phycomp	5	21.20	3.56	24.76	299.23
Phycomp	2.4	24.00	0.57	24.57	286.42
WNC	5	21.20	0.01	21.21	132.13
WNC	2.4	24.00	0.97	24.97	314.05

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)
Phycomp	5	3.56	2.27
Phycomp	2.4	0.57	1.14
WNC	5	0.01	1.00
WNC	2.4	0.97	1.25

$G = Log^{-1}$ (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)
Phycomp	5	131.83	2.27	0.060	1.00
Phycomp	2.4	251.19	1.14	0.057	1.00
WNC	5	131.83	1.00	0.026	1.00
WNC	2.4	251.19	1.25	0.062	1.00

$S = PG/(4R^2\pi)$

Where

S = Maximum power density (mW/cm^2)

$\quad$ P = Power input to the antenna (mW).

$\quad$ 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.