



MPE Calculations

Systems operating under the provision of 47 CFR 1.1307(b)(1) shall be operated in a manner 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 $\text{Log}^{-1}(\text{dBm}/10)$ (mW)
Compal HDL20	2.4	24.76	2.96	27.72	591.56
Compal HDL20	5	19.90	1.29	21.19	131.52

$\text{EIRP} = P + G$

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 $\text{Log}^{-1}(\text{dBm}/10)$ (dB)
Compal HDL20	2.4	2.96	1.98
Compal HDL20	5	1.29	1.35

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

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)
Compal HDL20	2.4	299.23	1.98	0.118	1.00
Compal HDL20	5	97.72	1.35	0.026	1.00

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

Where

S = Maximum power density (mW/cm²)

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/cm².

The power density at 20cm does not exceed the 1mW/cm² limit. Therefore, the exposure condition is compliant with FCC rules.