



RF EXPOSURE EVALUATION

Applicant : Haier US Appliance Solutions, Inc.

Applicant Address : Appliance Park AP5-2N-65, Louisville, Kentucky, KY
40225, United States

Kind of Product : Wi-Fi/Bluetooth Combo Solder-down Module

**Equipment
model name** : WCATE001

FCC ID : ZKJ-WCATE001

Standard Requirement

The following RF exposure procedures are applicable :

- FCC Rules
 Part 1.1310 Radiofrequency radiation exposure limits

Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			<u>1.0</u>	30

f = frequency in MHz

* = Plane-wave equivalent power density

MPE Calculations

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user. The MPE calculation for this exposure is shown below.

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

$EIRP = P + G$	Where, P = Power input to the antenna (mW) G = Power gain of the antenna (dBi)
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The numeric gain(G) of the antenna with a gain specified in dB is determined by:

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

Power density at the specific separation:

$S = PG / (4R^2\pi)$	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)
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Estimated safe separation:

$R = \sqrt{(PG / 4\pi)}$	Where, 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)
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RF Exposure Results

Mode	Measured Max Output Power (dBm)	Antenna Gain (dBi)	Power tolerance (dB)	EIRP (dBm)	EIRP (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	R (cm)
BLE	5.39	2.00	+2	9.39	8.69	0.0017	1.000	20
WLAN 2.4 GHz	19.88	2.00	+2	23.88	244.34	0.0486		

Conclusion

This confirms compliance to the required Radio frequency radiation exposure limit.