Client	**Ecobee Inc**
Product	**Athena**
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2014

Maximum Permissible Exposure

Purpose

The purpose of this test is to ensure that the RF energy intentionally transmitted, in terms of power density emitted from the EUT at a stated operating distance does not exceed the limits listed below as defined in the applicable test standard, as calculated based upon readings obtained during testing. This helps protect human exposure to excessive RF fields.

Limit(s) and Method

The limits, as defined FCC 1.1310 Table 1 (B) limits for general public exposure was applied. The limits for the frequency ranges 300 MHz to 1.5 GHz and 1.5 GHz to 100 GHz was applied. The limits are f/1500 mW/ cm^2 and 1.0 mW/ cm^2 respectively. The distance used for calculations was 20 cm, as this is the minimum distance an operator will be from the EUT during normal operation, as stated by the manufacturer.

Results

The EUT passed the requirements. The worst case calculated power density was 0.02 mW/cm^2, this is significantly under the 1.0 mW/cm^2 requirement.

Calculations

15.247 Device

Method 1 (conducted power)
Internal antenna

$P_d = (P_t*G) / (4*pi*R^2)$
Where Pt = 18.68 dBm or 73.79 mW as per Peak power conducted output
Where G = 2.1 dBi, or numerically 1.62
Where R = 20 cm

$P_d = (73.79\ mW * 1.62) / (4 * pi * 20cm^2)$
$P_d = 73.79\ mW / 5026\ cm^2$
$P_d = 0.024\ mW/cm^2$

15.249 Device

Method 2 (EIRP)
PCB antenna

P_d = EIRP / (4*pi*R^2)

Where EIRP = equivalent isotropic radiated power
Where R = 20 cm

EIRP = E(dBuV/m) – 95.2
EIRP = 93.1 -95.2
EIRP = -2.1 dBm or 0.61 mW

P_d = 0.61 mW / (4 * pi * 20cm^2)
P_d = 0.61 mW / 5026 cm^2
P_d = 0.00012 mW/cm^2

The limit for 927 MHz is (927/1500) = 0.618 mW/cm^2

The power density for Zigbee module is 0.0284 mW/cm^2

The sum of ratios for each transmitter is
(P_d(WIFI)/Limit(WIFI)) + (P_d (903 MHz TX)/Limit) + (P_d(Zigbee)/Limit)

(0.024/1.0) + (0.00012/0.618) + (0.0284/1.0) = 0.053

The MPE requirement for collocated antennas are that the sum of ratios should be less than 1.

The EUT meets the antenna collocation MPE requirements.