Intertek

Calculation of co-located operation
(in accordance with FCC multi-transmitter procedures)

The Electronic Wall Mounted Access Control Reader contains four RF transmitters:

Wi-Fi radio, 2412-2472MHz range of operation, RF power at antenna is 0.0166W (or 12.21dBm), Antenna Gain is 1.9dBi;

BLE radio, 2402-2480MHz range of operation, RF power at antenna is 0.000596W (-2.25dBm), Antenna Gain is -1dBi;.

BLE (Lens) radio, 2402-2480MHz range of operation, RF power at antenna is 0.000137W (-8.63dBm), Antenna Gain is 1.69dBi;.

RFID radio), 13.56MHz range of operation, RF power at antenna is 0.000008mW (-50.9dBm), Antenna Gain is 0dBi.

Three Radios operate at 2.4GHz range and one NFC RFID radio operates at 13.56MHz. To simplify calculation total power of four radios will be used. Full power (with no reduction) will be considered for calculation.

For the Wi-Fi radio the maximum measured antenna conducted power, P is 12.21Bm
The antenna gain, G is 1.9dBi
The maximum EIRP power = P + G
EIRP = 12.21dBm + 1.9dBi = 14.11dBm = 25.76mW = 0.02576W

For the BLE radio the maximum calculated power P is -2.25dBm (based on the measured filed strength of 92.0dBμ/m)
The antenna gain, G is -1.0dBi
The maximum EIRP power = P + G
EIRP = -2.25 + (-1) = -3.25dBm, or 0.47mW

For the BLE (Lens) radio the maximum calculated power P is -8.63dBm (based on the measured filed strength of 88.4dBμ/m)
The antenna gain, G is 1.69dBi
The maximum EIRP power = P + G
EIRP = -8.63 + 1.69 = -6.94dBm, or 0.2mW

For the RFID radio the maximum calculated power P is -50.9dBm (based on the measured filed strength of 44.3dBμ/m)
The antenna gain, G is 0dBi
The maximum ERP power = P + G
ERP = -50.9 + 0 = -50.9dBm, or 0.000008mW

The Maximum RF Power transmitted by the Device is 25.76mW + 0.47mW+0.2mW+0.000008mW = 26.43mW

The limits for Maximum Permissible Exposure (MPE) level of Transmitter Power Density at operating frequency is 1mW/cm^2

The Power Density, S in mW/cm^2 is related to radiated power P in mW and Antenna Separation Distance from any person, D in cm with the equation:

$S = ERP / 4\pi D^2$

If antenna Safe Separation Distance from any person D is 20cm,
$S = 26.43 / 4\pi 20^2$,
$S = 0.0053mW/cm^2$, or below the Maximum Permissible Exposure (MPE) of $1mW/cm^2$

Conclusion.
The Electronic Wall Mounted Access Control Reader with four incorporated radios complies with the Maximum Permissible Exposure (MPE) limits as defined by FCC Part 1.1310

Prepared by: _M. Spector_____
Uri Spector

Reviewed by: _____   Date of issue: June 30, 2017
Norman Shpilsher