RF Exposure Considerations for the Zano One

FCC ID: 2AE23-ZANO1

The FCC requires that the calculated MPE for mobile equipment to be equal to or less than a given limit dependent on frequency at a distance of 20 cm from a device to the body of a user.

The transmitters in the Zano One cover 2412 -2462MHz WLAN and 915MHz ISM operation

The following FCC Rule Parts and procedures are applicable:

Part 1.1310 – Radiofrequency radiation exposure limits

Part 2.1091 – Radiofrequency radiation exposure evaluation: mobile devices

KDB447498 D01 v05 r02
Mobile and Portable Devices RF Exposure Procedures and Equipment Authorisation Policies

MPE CALCULATIONS

The following MPE calculation is used to calculate the safe operating distance for the user.

$$S = EIRP/4 \pi R^2$$

Where

S = Power density

EIRP = Effective Isotropic Radiated Power (EIRP = P x G)

P = Conducted Transmitter Power

G = Antenna Gain (relative to an isotropic radiator)

R = distance to the centre of radiation of the antenna (safe operating distance)

For 915MHz

Values:

Transmitter frequency = 915 MHz

Measured field strength E = 73.7dBuV/m

$P = (E \times d)^2 / 30$ with d = 3 m

= 0.007mW

G_{eff} = 0dBi

EIRP = 0.007mW

R = 20cm

Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310 for 915MHz

$S_{req1} = f_{MHz}/1500$ mW/cm^2

= 0.61mW/ cm^2

Calculation:

$S = 0.007/4 \pi R^2$

$S = 0.007/(12.56 \times 20^2)$

$S = 0.007/(5024)$

$S_1 = 1.4 \times 10^{-6}$mW/ cm^2 (<0.61 mW/cm^2)

For WLAN 2.4GHz

Values:

Transmitter frequency range = 2412 MHz to 2462MHz

P_{avge} = 18dBm max. (63 mW)

G = 2.5dBi (x1.8)

EIPP = 113.6mW

R = 20cm

Power Density Requirement

From table 1 (b) - Limits for General Population/ Uncontrolled Exposure of FCC Rule Part 1.1310 for 2.4GHz

S_{req2} = 1.0 mW/cm^2

Calculation:

$S = EIRP/4 \pi R^2$

$S = 113.6/(12.56 \times 20^2)$

$S = 113.6/(5024)$

S_2 = 0.023mW/ cm^2 (<1.0 mW/cm^2)

KDB447498 D01 v05 Section 7.2 SIMULTANEOUS TRANSMISSION CONSIDERATIONS

Requirement:

Summation of calculated MPE ratios for 2.4GHz WLAN and 915MHz simultaneously transmitting

ie: $\Sigma MPE_{ratios} = (S_1/ S_{req1}) + (S_2/ S_{req2}) \leq 1.0$

$= (1.4 \times 10^{-6}/0.61) + (0.023/1.0)$

$= 0.023$

Σ of MPE ratios are <1.0, so in accordance with KDB447498 Section 7.2, simultaneous transmission test exclusion applies for the WLAN and 915MHz transmitters.

Conclusion

The required 20cm RF exposure limits for General Population/ Uncontrolled Exposure will not be exceeded for the Zano One.

Signed

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