



Exemption from Routine Evaluation – MPE Exposure Evaluation

Applicant: Eppendorf SE
FCC ID: 2AXZD0116800152
Model number/name: MotorCap Multi

The above device is integrated into a host and co-located with an RFID module with FCC ID: 2AXZD0116800209. Both devices can transmit simultaneously.

The above device is exempt from Routine Evaluation, when compared against the MPE RF Exposure Evaluation Limits specified in **FCC Rule Part 1.1310** for mobile devices acc. to **FCC Rule Part 2.1091**:

The separation distance between the user and/or bystander and the device's radiating element must be greater than 20 cm.

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For RFID (13.56 MHz):

Maximum field strength = 15.72 dBμV/m @3m

$EIRP_1 = [15.72 - 95.2] \text{ dBm} = -79.48 \text{ dBm} = \underline{11.3 \cdot 10^{-9} \text{ mW}}$

According to table 1(ii) of Part 1.1310(e)(1), the Power Density limit for devices operating in the frequency range 1.34-30 MHz is: $S_{Lim1} = 180/f^2 \text{ mW/cm}^2 = \underline{0.979 \text{ mW/cm}^2}$ @13.56 MHz
(f = frequency in MHz)

The Power Density of this transmitter at a separation distance of 20 cm can be calculated as follows:

$$S_{EIRP1} = EIRP_1 / (4 \cdot \pi \cdot R^2) = \underline{2.242 \cdot 10^{-12} \text{ mW/cm}^2}$$

(S = Power Density, EIRP = Effective Isotropic Radiated Power, R = Separation Distance)

The Power Density of $2.242 \cdot 10^{-12} \text{ mW/cm}^2$ is below the MPE RF Exposure Evaluation Exemption Limit of 0.979 mW/cm^2 .

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For RFID (13.56 MHz):

Maximum field strength @3m = 42.054 dBμV/m

$EIRP_2 = [42.054 - 95.2] \text{ dBm} = -53.146 \text{ dBm} = \underline{4.85 \cdot 10^{-6} \text{ mW}}$

According to table 1(ii) of Part 1.1310(e)(1), the Power Density limit for devices operating in the frequency range 1.34-30 MHz is: $S_{Lim2} = 180/f^2 \text{ mW/cm}^2 = \underline{0.979 \text{ mW/cm}^2}$ @13.56 MHz
(f = frequency in MHz)

The Power Density of this transmitter at a separation distance of 20 cm can be calculated as follows:

$$S_{EIRP2} = EIRP_2 / (4 \cdot \pi \cdot R^2) = \underline{0.964 \cdot 10^{-9} \text{ mW/cm}^2}$$

(S = Power Density, EIRP = Effective Isotropic Radiated Power, R = Separation Distance)

The Power Density of $0.964 \cdot 10^{-9} \text{ mW/cm}^2$ is below the MPE RF Exposure Evaluation Exemption Limit of 0.979 mW/cm^2 .

Simultaneous Transmission Considerations acc. to KDB447498 D01 v06, Section 7.2

$$\begin{aligned}\Sigma \text{MPE}_{\text{ratios}} &= (\text{S}_{\text{EIRP1}} / \text{S}_{\text{Lim1}}) + (\text{S}_{\text{EIRP2}} / \text{S}_{\text{Lim2}}) \leq 1 \\ &= (2.242 \cdot 10^{-12} \text{ mW/cm}^2 / 0.979 \text{ mW/cm}^2) + (0.964 \cdot 10^{-9} \text{ mW/cm}^2 / 0.979 \text{ mW/cm}^2) \\ &= 0.987 \cdot 10^{-9} \leq 1\end{aligned}$$

The sum of the MPE ratios of the above transmitters is ≤ 1.0 and thus complies with the exemption for configurations with simultaneous transmission.

Conclusion: The above device is exempt from Routine Evaluation.

Certification Body

UL International (UK) Ltd