

KRUG & PRIESTER GmbH & Co. KG, D-72336 Balingen

RF Exposure Considerations for the AP40 PRO

FCC ID: 2A3QI-7310231

The AP40 PRO operates at 13.56MHz, and also uses a 2.4GHz pre-certified module (FCC ID: 2ACSVHF-LTP120). The 13.56MHz and 2.4GHz, transmitters can transmit simultaneously.

The FCC requires that the calculated MPE 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 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 v06

Mobile and Portable Devices RF Exposure Procedures and Equipment Authorisation Policies

AP40 PRO MAXIMUM TRANSMITTER POWER CONSIDERATIONS

13.56MHz:

Tx Power: +56dBuV/m @3m (maximum stated power from Operational Description).
EIRP = 56 - 95.3dBm = -39.3dBm

2412 – 2462MHz:

Tx Power: 0.0442W (16.45dBm) conducted (From FCC Grant 2ACSVHF-LPT120)

Antenna gain: 1.5dBi

EIRP = 17.95dBm



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MPE CALCULATIONS

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

$$S = \text{EIRP} / 4 \pi R^2$$

Where S = Power density
 EIRP = Effective Isotropic Radiated Power
 R = distance to the centre of radiation of the antenna (safe operating distance)

For 13.56MHz :Values:

EIRP = -39.3dBm
 = 0.00012mW

R = 20cm

Power Density Requirement

From table 1 (e) - Limits for General Population/ Uncontrolled Exposure of
 FCC Rule Part 1.1310 for 13.56MHz

$$S_{\text{req1}} = 180/f^2 = 0.98 \text{ mW/cm}^2$$

Calculation:

$$S = 0.00012 / 4 \pi R^2$$

$$S = 0.00012 / (12.56 \times 20^2)$$

$$S = 0.00012 / (5024)$$

$$S_1 = 2.4 \times 10^{-8} \text{ mW/cm}^2 (< 0.98 \text{ mW/cm}^2)$$



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For 2.4GHz:**Values:**

Transmitter frequency range = 2412 MHz to 2462 MHz

EIRP = 17.95dBm

= 62.34mW

R = 20cm

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

$$S_{req2} = 1.0 \text{ mW/cm}^2$$

Calculation:

$$S = 62.34/4 \pi R^2$$

$$S = 62.34/(12.56 \times 20^2)$$

$$S = 62.34/(5024)$$

$$S_2 = 0.012 \text{ mW/cm}^2 (< 1.0 \text{ mW/cm}^2)$$

KDB447498 D01 v05 Section 7.2 SIMULTANEOUS TRANSMISSION CONSIDERATIONS

The equipment operates from a single antenna. All transmitters can transmit simultaneously.

As per KDB, summation of calculated MPE ratios for WLAN 2.4GHz + 5GHz:

$$\Sigma \text{MPE}_{ratios} = (S_1 / S_{req1}) + (S_2 / S_{req2})$$

$$= (2.4 \times 10^{-8} / 0.98) + (0.012 / 1.0)$$

$$= 0.012$$

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

Conclusion

The required 20cm RF exposure limits for General Population/ Uncontrolled Exposure will not be exceeded for the AP40 PRO



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