Test Report

Maximum Permissible Exposure (MPE) Calculations

AIR-AP1852 Series

FCC ID: LDK102095

2400-2483.5 MHz, 5150-5250 MHz,

5250-5350 MHz, 5470-5725 MHz, 5725-5850 MHz

Against the following Specifications:

CFR47 Part 15.247 and 15.407

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Devices are subject to the radio frequency radiation exposure requirements specified in Sec. 1.1307(b), Sec. 2.1091 and Sec. 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a ``general population/uncontrolled'' environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Given

$E=\sqrt{(30*P*G)}/d$ and $S=E^2/3770$

where

E=Field Strength in Volts/meter
P=Power in Watts
G=Numeric Antenna Gain
d=Distance in meters
S=Power Density in mW/cm^2

Combine equations and rearrange the terms to express the distance as a function of the remaining variables:

$d=\sqrt{((30*P*G)/(3770*S))}$

Changing to units of power in mW and distance in cm, using:

P(mW)=P(W)/1000 d(cm)=100*d(m)

yields

$d=100*\sqrt{((30*(P/1000)*G)/(3770*S))}$
$d=0.282*\sqrt{(P*G/S)}$

where

d=Distance in cm
P=Power in mW
G=Numerica Antenna Gain
S=Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P(mW)=10^(P(dBm)/10) G(numeric)=10^(G(dBi)/10)

yields

$d=0.282*10^{((P+G)/20)}/\sqrt{S}$ Equation (1)

and

$s=((0.282*10^{((P+G)/20)})/d)^2$ Equation (2)

where

d=MPE distance in cm
P=Power in dBm
G=Antenna Gain in dBi
S=Power Density in mW/cm^2

Equation (1) and the measured peak power are used to calculate the MPE distance. Note that for mobile or fixed location transmitters such as an access point, the minimum separation distance is 20 cm even if the calculations indicate that the MPE distance may be less.

S=1mW/cm^2 maximum. Using the peak power levels and associated antenna gains recorded in the test report along with Equation 1 above, the MPE distances are calculated as follows.

MPE Calculations:

Frequency (MHz)	Power Density (mW/cm^2)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)	Limit (cm)	Margin (cm)
2412	1	20.6	7	6.76	20	13.24
2437	1	20.6	11	10.72	20	9.28
2462	1	16.6	11	6.76	20	13.24
5180	1	20.6	6	6.03	20	13.97
5230	1	21.0	12	12.60	20	7.40
5260	1	20.6	6	6.03	20	13.97
5320	1	20.8	12	12.31	20	7.69
5500	1	20.5	6	5.96	20	14.04
5580	1	20.3	6	5.82	20	14.18
5720	1	20.7	6	6.10	20	13.90
5745	1	15.6	6	3.39	20	16.61
5785	1	20.7	6	6.10	20	13.90
5795	1	20.7	6	6.10	20	13.90
5825	1	20.5	6	5.96	20	14.04

Frequency (MHz)	Power Density (mW/cm^2)	Maximum Radiated Power (dBm)	MPE Distance (cm)	Limit (cm)	Margin (cm)
2437/5320	1	35.4	16.61	20	3.39

To maintain compliance, installations will assure a separation distance of at least 20cm.

Using Equation 2, the MPE levels (s) at 20 cm are calculated as follows:

Frequency (MHz)	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Margin (mW/cm^2)
2412	20	20.6	7	0.11	1	0.89
2437	20	20.6	11	0.29	1	0.71
2462	20	16.6	11	0.11	1	0.89
5180	20	20.6	6	0.09	1	0.91
5230	20	21.0	12	0.40	1	0.60
5260	20	20.6	6	0.09	1	0.91
5320	20	20.8	12	0.38	1	0.62
5500	20	20.5	6	0.09	1	0.91
5580	20	20.3	6	0.08	1	0.92
5720	20	20.7	6	0.09	1	0.91
5745	20	15.6	6	0.03	1	0.97
5785	20	20.7	6	0.09	1	0.91
5795	20	20.7	6	0.09	1	0.91
5825	20	20.5	6	0.09	1	0.91

Frequency (MHz)	MPE Distance (cm)	Maximum Radiated Power (dBm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Margin (mW/cm^2)
2437/5320	20	35.4	**0.69**	1	0.31