MPE Calculation

Product:	Wireless AP
Model no.:	AP-N505L
Trade Mark:	FS
FCC ID:	2A2PW108705
Rating:	IEEE 802.3af PoE, DC 48V/0.3A
RF Transmission Frequency:	For Bluetooth Low Energy/Bluetooth: 2402-2480MHz For Wi-Fi 2.4G: 2412~2462 MHz For Wi-Fi 5GHz: 5180MHz – 5320MHz, 5500MHz – 5720MHz, 5745MHz – 5825MHz
Antenna Type:	Internal Antenna
Max Antenna Gain:	1dBi max for 2.4GHz Bluetooth Low Energy 3dBi max for 2.4GHzWIFI 3dBi Max for 5GHzWIFI
Description of the EUT:	The equipment supports Bluetooth Low Energy/ Wi-Fi functions. The TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHzWi-Fi, 5180MHz – 5320MHz, 5500MHz – 5720MHz, 5745MHz – 5825MHz for 5GHzWi-Fi

According to subpart 15.247(i)and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1,500	/	/	f/1500	30
1,500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

for 5G Wi-Fi

Maximum peak output power at antenna input terminal (dBm):	18.5
Maximum peak output power at antenna input terminal (mW):	70.79
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	3
Maximum Antenna Gain (numeric):	2
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0422
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For 2.4G Wi-Fi

Maximum peak output power at antenna input terminal (dBm):	15.5
Maximum peak output power at antenna input terminal (mW):	35.48
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	3
Maximum Antenna Gain (numeric):	2
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0212
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

For BLE

Maximum peak output power at antenna input terminal (dBm):	-1.95
Maximum peak output power at antenna input terminal (mW):	0.64
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	1
Maximum Antenna Gain (numeric):	1.26
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0004
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

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For simultaneous transmission

Simultaneous transmission configuration	Power density(mW/cm2)	MPE Limit (mW/cm2)
5G Wi-Fi+BLE	0.0426	1.0
2.4G Wi-Fi+BLE	0.0216	1.0
5G Wi-Fi+ 2.4G Wi-Fi	0.0634	1.0

Result: Compliant

TUV SUD China, Shenzhen Branch

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