



Revision History

Report No.	Version	Description	Issue Date
1311RSU00104	Rev. 01	Initial report	2013-11-30

1. RF Exposure Evaluation

1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

r = distance between observation point and center of the radiator in cm (The minimum distance is 20cm)

P_d is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

1.2. Test Result of RF Exposure Evaluation

Product	2.4GHz&5GHz 3x3 Outdoor AP
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 13dBi for 2.4GHz and 15dBi for 5GHz in logarithm scale.

For 2.4G Band:

Test Mode	Frequency Band (MHz)	Maximum Average output power (dBm)	Power Density at r = 20 cm (mW/cm ²)	Limit of Power Density S(mW/cm ²)
802.11b/g/n(20MHz)	2412 ~ 2462	17.64	0.231	1
802.11n(40MHz)	2422 ~ 2452	14.09	0.102	1

For 5G ISM Band:

Test Mode	Frequency Band (MHz)	Maximum Average output power (dBm)	Power Density at r = 20 cm (mW/cm ²)	Limit of Power Density S(mW/cm ²)
80.211a/n(20MHz)	5745 ~ 5825	19.98	0.626	1
802.11n(40MHz)	5755 ~ 5795	19.88	0.612	1

For 5G UNII Band:

Test Mode	Frequency Band (MHz)	Maximum Average output power (dBm)	Power Density at r = 20 cm (mW/cm ²)	Limit of Power Density S(mW/cm ²)
80.211a/n(20MHz)	5180 ~ 5240	6.44	0.028	1
802.11n(40MHz)	5190 ~ 5230	7.89	0.039	1

CONCLUSION:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously.

Therefore, the worst-case situation is:

$$0.231\text{mW/cm}^2 + 0.626\text{mW/cm}^2 = 0.857\text{mW/cm}^2 < 1\text{mW/cm}^2$$

This confirmed that the device comply with FCC 1.1310 MPE limit.

The End