



FCC ID: 2ALP7TNP01

1. FCC 47CFR §2.1091 REQUIREMENT

1.1 TEST STANDARDS

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The gain of the antennas used in the product is extracted from the Antenna data sheets provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis Transmission formula is far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

1.2 LIMIT

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of the 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)
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

F= Frequency in MHz

Friss Formula

Friss Transmission 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 the center of radiator in cm

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.

1.3 EUT OPERATION CONDITION

EUT was enabled to transmit and receive at lowest, middle and highest channels.

1.4 CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance from the antenna should be included in the User manual. So, this device is classified as Mobile device.



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1.5 TEST RESULT

Power Result

Mode	MAX AVG Power
BLE 1M	5±1dBm
BLE 2M	5±1dBm
WIFI	
802 11b	20.50
802.11g	20.00
802.11n-HT20	19.00
802.11n-HT40	18.50

The MPE result of worst mode:

RF Function	Frequency (MHz)	Max Turn up Power (dBm)	Max Turn up Power (mW)	ANT Gain (dBi)	ANT Gain (gain of antenna in linear scale)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio	Result
BLE 1M	2480	6.00	3.98	3.26	2.12	0.002	1	0.002	Pass
BLE 2M	2480	6.00	3.98	3.26	2.12	0.002	1	0.002	Pass
WIFI b	2412	20.50	112.20	3.26	2.12	0.047	1	0.047	Pass
	2437	20.50	112.20	3.26	2.12	0.047	1	0.047	Pass
	2462	20.50	112.20	3.26	2.12	0.047	1	0.047	Pass

The max MPE of BLE & WIFI simultaneous transmission:

$$0.002(\text{BLE}) + 0.047 = 0.049 < 1$$

Note:

1. The Maximum Power Density is less than the limit, complies with the exemption requirements.

*****END OF THE REPORT*****