RF Exposure Report

FCC ID: Z63-E95A

RF Exposure Measurement

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.

RF Exposure 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)

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

Limits for Maximum Permissible Exposure (MPE)

F= Frequency in MHz

Friss Formula

Friss Transmission Formula: $Pd = (Pout * G) / (4*pi*r^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 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.

EUT Operation condition

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

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.

2.4G WIFI

Mode	802.11b/g/n20:2412-2462MHz
Detector	PEAK
802.11b CH01	13±1dBm
802.11b CH06	11±1dBm
802.11b CH11	10±1dBm
802.11g CH01	20±1dBm
802.11g CH06	16±1dBm
802.11g CH11	14±1dBm
802.11n20 CH01	20±1dBm
802.11n20 CH06	18±1dBm
802.11n20 CH11	16±1dBm
802.11n40 CH03	18±1dBm
802.11n40 CH06	17±1dBm
802.11n40 CH09	17±1dBm

ANT Gain (G)

Antenna gain : 3dBi (gain of antenna in linear scale=1.995)

Protocol	ANT Gain(gain of antenna in linear scale)	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Output Power to Antenna (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)
802.11b CH01	1.995	2412	14	25.118864	0.0099695	1
802.11b CH06	1.995	2437	12	15.848932	0.0062903	1
802.11b CH11	1.995	2462	11	12.589254	0.0049966	1
802.11g CH01	1.995	2412	21	125.89254	**0.0499657**	1
802.11g CH06	1.995	2437	17	50.118723	0.0198917	1
802.11g CH11	1.995	2462	15	31.622777	0.0125508	1
802.11n20 CH01	1.995	2412	21	125.89254	**0.0499657**	1
802.11n20 CH06	1.995	2437	19	79.432823	0.0315262	1
802.11n20 CH11	1.995	2462	17	50.118723	0.0198917	1
802.11n40 CH03	1.995	2422	19	79.432823	0.0315262	1
802.11n40 CH06	1.995	2437	18	63.095734	0.0250422	1
802.11n40 CH09	1.995	2452	18	63.095734	0.0250422	1

According to the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value 0.0499657 at distance 20cm. This is less than the limit 1, so the Compliance the RF exposure requirement.