



## RF Exposure Evaluation

### Limits

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 <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

Friis transmission formula:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

**Pd** = power density in mW/cm<sup>2</sup>, **Pout** = output power to antenna in mW;

**G** = gain of antenna in linear scale, **Pi** = 3.1416;

**R** = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

### Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



## Test Result of RF Exposure Evaluation

BT mode					
Mode	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
GFSK	2.441	1.75	0.000599	1.0	PASS
$\pi/4$ -DQPSK	-0.317	0.93	0.000318	1.0	PASS
8-DPSK	-1.331	0.74	0.000252	1.0	PASS

Remark: antenna gain=2.36dBi

2.4G WIFI mode							
Mode	Output power to antenna (dBm)		Output power to antenna (mW)		Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
802.11b	15.847		38.43		0.013165	1.0	PASS
802.11g	14.561		28.58		0.009791	1.0	PASS
802.11n20	ANT1 14.024	ANT2 14.017	ANT1 25.26	ANT2 25.22	(ANT1/1)+(ANT2/1) =0.017291	1.0	PASS
802.11n40	ANT1 13.951	ANT2 13.869	ANT1 24.84	ANT2 24.37	(ANT1/1)+(ANT2/1) =0.016858	1.0	PASS
802.11n20 MIMO	15.024		31.80		0.021785	1.0	PASS
802.11n40 MIMO	14.217		26.41		0.018090	1.0	PASS

Remark: 802.11b/g/n antenna gain=2.36dBi, 802.11n(MIMO) antenna gain=5.37dBi;

The device can not transmit with 2.4GWIFI and BT simultaneously.