

## 7. RADIO FREQUENCY EXPOSURE

### 7.1. Limit

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

**Table: Limits for General Population/Uncontrolled Exposure**

Frequency Range (MHz)	Power Density (S) (mW/cm <sup>2</sup> )
0.3–1.34	*(100)
1.34–30	*(180/f <sup>2</sup> )
30–300	0.2
300–1500	f/1500
1500–100,000	1.0

F = frequency in MHz

\* = Plane-wave equivalent power density

### Maximum Permissible Exposure

The MPE was calculated at 20cm to show compliance with the power density limit.

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna.

Note:

1. Manufacturer declared that the maximum antenna gain is 5.0dBi(Max.) for 2412~2462MHz when single antenna transmits.
2. Manufacturer declared that the nearest distance between human and the EUT is 20cm.
3. Only record worst case data.

## 8.2 Test Results

## Standalone MPE

## 2.4G wifi:

Test	Mode	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	Chain 0	1	15.56	16.0±1.0	50.1187	0.0315	1.0
		6	16.29	16.0±1.0	50.1187	0.0315	1.0
		11	16.63	16.0±1.0	50.1187	0.0315	1.0
	Chain 1	1	15.15	16.0±1.0	50.1187	0.0315	1.0
		6	15.86	16.0±1.0	50.1187	0.0315	1.0
		11	15.94	16.0±1.0	50.1187	0.0315	1.0

Test	Mode	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11g	Chain 0	1	14.56	14.0±1.0	31.6228	0.0199	1.0
		6	14.39	14.0±1.0	31.6228	0.0199	1.0
		11	14.34	14.0±1.0	31.6228	0.0199	1.0
	Chain 1	1	14.06	14.0±1.0	31.6228	0.0199	1.0
		6	14.11	14.0±1.0	31.6228	0.0199	1.0
		11	14.05	14.0±1.0	31.6228	0.0199	1.0

Test	Mode	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11n20	Chain 0	1	13.98	13.0±1.0	25.1189	0.0158	1.0
		6	13.61	13.0±1.0	25.1189	0.0158	1.0
		11	13.46	13.0±1.0	25.1189	0.0158	1.0
	Chain 1	1	13.57	13.0±1.0	25.1189	0.0158	1.0
		6	13.62	13.0±1.0	25.1189	0.0158	1.0
		11	13.34	13.0±1.0	25.1189	0.0158	1.0

Test	Mode	Channel	ANT Power (dBm)	ANT Max. Tune Up Power (dBm)	ANT Max. Tune Up Power (mW)	ANT MPE (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11n40	Chain 0	3	12.43	12.0±1.0	19.9526	0.0126	1.0
		6	12.46	12.0±1.0	19.9526	0.0126	1.0
		9	12.76	12.0±1.0	19.9526	0.0126	1.0
	Chain 1	3	11.86	12.0±1.0	19.9526	0.0126	1.0
		6	11.82	12.0±1.0	19.9526	0.0126	1.0
		9	12.06	12.0±1.0	19.9526	0.0126	1.0

**Simultaneous transmission MPE**

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;  
 $\Sigma$  of MPE ratios  $\leq$  1.0

Mode	Channel No.	Frequency (MHz)	$\Sigma$ MPE ratios	Limit	Results
Chain 0+Chain 1					
IEEE 802.11b	1	2412	N/A	1.000	Pass
	6	2442	N/A	1.000	Pass
	11	2462	N/A	1.000	Pass
IEEE 802.11g	1	2412	N/A	1.000	Pass
	6	2442	N/A	1.000	Pass
	11	2462	N/A	1.000	Pass
IEEE 802.11n HT20	1	2412	0.0316	1.000	Pass
	6	2442	0.0316	1.000	Pass
	11	2462	0.0316	1.000	Pass
IEEE 802.11n HT40	3	2422	0.0251	1.000	Pass
	6	2442	0.0251	1.000	Pass
	9	2452	0.0251	1.000	Pass

**Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device