

## 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:  $Pd = (Pout * G) / (4 * \pi * r^2)$

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

	Frequency (MHz)	Output power (dBm)	Max tune-up		Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
			dBm	mW			
WIFI 2.4G (SISO)	2437	19.69	20	100	0.032	1.0	PASS
WIFI 2.4G (MIMO)	2422	19.72	20	100	0.032	1.0	PASS
UNII BAND 1 (SISO)	5200	12.35	13	19.95	0.006	1.0	PASS
UNII BAND 1 (MIMO)	5230	14.31	15	31.62	0.01	1.0	PASS
UNII BAND II-2A (SISO)	5260	12.10	13	19.95	0.006	1.0	PASS
UNII BAND II-2A (MIMO)	5300	14.22	15	31.62	0.01	1.0	PASS
UNII BAND II-2C (SISO)	5580	12.58	13	19.95	0.006	1.0	PASS
UNII BAND II-2C (MIMO)	5580	14.25	15	31.62	0.01	1.0	PASS
UNII BAND III (SISO)	5825	12.68	13	19.95	0.006	1.0	PASS
UNII BAND III (MIMO)	5755	12.66	13	19.95	0.006	1.0	PASS
WCDMA BAND II	1880	22.86	23	199.53	0.063	1.0	PASS
WCDMA BAND V	826.4	22.74	23	199.53	0.063	0.55	PASS
LTE BAND 2	1905	22.25	23	199.53	0.063	1.0	PASS
LTE BAND 4	1732.5	24.98	25	316.23	0.1	1.0	PASS
LTE BAND 5	826.5	21.82	22	158.49	0.05	0.55	PASS
LTE BAND 7	2535	21.80	22	158.49	0.05	1.0	PASS

### Antenna Gain (dBi):

	ANT 1	ANT 2
WIFI 2.4G	2	2
U-NII Band 1	2	2
U-NII Band II-2A	2	2
U-NII Band II-2C	2	2
U-NII Band III	2	2



WCDMA BAND II	2
WCDMA BAND V	2
LTE BAND 2	2
LTE BAND 4	2
LTE BAND 5	2
LTE BAND 7	2

802.11n/ac could work in Synchronous transmitting mode.

The maximum simultaneously power density were as below

WCDMA BAND II+2.4G WIFI+5G WIFI:  $0.1 < 1$ .

WCDMA BAND V +2.4G WIFI+5G WIFI:  $0.15 < 1$

LTE BAND 2+2.4G WIFI+5G WIFI:  $0.1 < 1$

LTE BAND 4+2.4G WIFI+5G WIFI:  $0.14 < 1$

LTE BAND 5+2.4G WIFI+5G WIFI:  $0.13 < 1$

LTE BAND 7+2.4G WIFI+5G WIFI:  $0.09 < 1$

The max power density is less than MPE exempt limit, so it is compliance.