1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

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

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

1.2 Maximum Permissible Exposure (MPE) Evaluation

802.11b Main									
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT
1	2412	1	19.75	94.41	1 Watt =	30.00	dBm	PASS
6	2437	1	19.83	96.16	1 Watt =	30.00	dBm	PASS
11	2462	1	**20.04**	100.93	1 Watt =	30.00	dBm	PASS
802.11b Main								
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
1	2412	1	17.14	51.76	1 Watt =	30.00	dBm	PASS
6	2437	1	17.59	57.41	1 Watt =	30.00	dBm	PASS
11	2462	1	**17.64**	58.08	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11b 2412~2462)

Prediction of MPE limit at a given distance

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

Where: 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

Maximum Pav :	99.159096	(mW)
Peak Antenna gain (Maximum):	2.57	(dBi)
Peak Antenna gain (linear):	1.8071741	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.036	(mW/cm2)

Measurement Result

The predicted power density level at 20 cm is 0.036 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 2462MHz.

1.3 Maximum Permissible Exposure (MPE) Evaluation

802.11g Main								
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT
1	2412	6	24.52	283.14	1 Watt =	30.00	dBm	PASS
6	2437	6	**25.61**	363.92	1 Watt =	30.00	dBm	PASS
11	2462	6	24.53	283.79	1 Watt =	30.00	dBm	PASS
802.11g Main								
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
1	2412	6	15.58	36.12	1 Watt =	30.00	dBm	PASS
6	2437	6	**17.37**	54.55	1 Watt =	30.00	dBm	PASS
11	2462	6	16.19	41.57	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11g 2412~2462)

Prediction of MPE limit at a given distance

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

Where: 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

Max. output power including tune-up tolerancel:	25.61	(dBm)
Max. output power including tune-up tolerancel:	363.91504	(mW)
Duty cycle:	90.32	(%)
Maximum Pav :	328.68806	(mW)
Peak Antenna gain (Maximum):	2.57	(dBi)
Peak Antenna gain (linear):	1.8071741	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.118	(mW/cm2)

Measurement Result

The predicted power density level at 20 cm is 0.118 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437MHz.

1.4 Maximum Permissible Exposure (MPE) Evaluation

802.11n_HT20M Main								
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT
1	2412	MCS0	24.26	266.69	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	**25.46**	351.56	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	24.34	271.64	1 Watt =	30.00	dBm	PASS
802.11n_HT20M Main								
CH	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
1	2412	MCS0	14.78	30.06	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	**17.42**	55.21	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	15.01	31.70	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11n20 2412~2462)

Prediction of MPE limit at a given distance

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

Where: 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

Max. output power including tune-up tolerance:	25.46	(dBm)
Max. output power including tune-up tolerancel:	351.56044	(mW)
Duty cycle:	89.51	(%)
Maximum Pav :	314.68175	(mW)
Peak Antenna gain (Maximum):	2.57	(dBi)
Peak Antenna gain (linear):	1.8071741	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.113	(mW/cm2)

Measurement Result

The predicted power density level at 20 cm is 0.113 mW/cm2.

This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437MHz.