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 §2.1093 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

Cable loss = 0		Peak Power Output				
CH	**Frequency (MHz)**	**Data Rate**				**Required Limit**
		1	**2**	**5.5**	**11**	
1	**2412**	17.89	17.82	17.75	17.72	**1 Watt = 30 dBm**
6	**2437**	**18.31**	18.19	18.08	18.01	**1 Watt = 30 dBm**
11	**2462**	18.21	18.08	18.05	18.03	**1 Watt = 30 dBm**

MPE Prediction (802.11b)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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 peak output power at antenna input terminal:	18.31	(dBm)
Maximum peak output power at antenna input terminal:	67.76415076	(mW)
Duty cycle:	100	(%)
Maximum Pav :	67.76415076	(mW)
Antenna gain (typical):	0.73	(dBi)
Maximum antenna gain:	1.183041556	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.015957	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.015957mW/cm^2. This is below the uncontrolled exposure limit of 1mW/cm^2 at 2437MHz.

802.11g

Cable loss = 0		Peak Power Output								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412	22.05	22.01	21.91	21.86	21.77	21.73	21.63	21.56	1 Watt = 30 dBm
6	2437	**23.37**	23.27	23.18	23.11	22.99	22.96	22.83	22.82	1 Watt = 30 dBm
11	2462	22.51	22.48	22.40	22.33	22.27	22.23	22.20	22.16	1 Watt = 30 dBm

MPE Prediction (802.11g)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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 peak output power at antenna input terminal:	23.37	(dBm)
Maximum peak output power at antenna input terminal:	217.2701179	(mW)
Duty cycle:	100	(%)
Maximum Pav :	217.2701179	(mW)
Antenna gain (typical):	0.73	(dBi)
Maximum antenna gain:	1.183041556	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.051162	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.051162mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2437MHz.

802.11n_20M

Cable loss = 0		Peak Power Output								
CH	**Frequency (MHz)**	**Data Rate**								**Required Limit**
		MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**	
1	**2412**	20.32	20.27	20.14	20.11	20.05	19.98	19.95	19.86	**1 Watt = 30 dBm**
6	**2437**	**22.78**	22.66	22.65	22.59	22.51	22.42	22.37	22.31	**1 Watt = 30 dBm**
11	**2462**	20.82	20.76	20.66	20.52	20.49	20.35	20.29	20.23	**1 Watt = 30 dBm**

MPE Prediction (802.11 n_20M)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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 peak output power at antenna input terminal:	22.78	(dBm)
Maximum peak output power at antenna input terminal:	189.6705921	(mW)
Duty cycle:	100	(%)
Maximum Pav :	189.6705921	(mW)
Antenna gain (typical):	0.73	(dBi)
Maximum antenna gain:	1.183041556	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.044663	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.044663mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2437MHz.

802.11n_20M

Cable loss = 0		Peak Power Output								
CH	**Frequency (MHz)**	**Data Rate**								**Required Limit**
		MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**	
1	**2412**	20.32	20.27	20.14	20.11	20.05	19.98	19.95	19.86	**1 Watt = 30 dBm**
6	**2437**	**22.78**	22.66	22.65	22.59	22.51	22.42	22.37	22.31	**1 Watt = 30 dBm**
11	**2462**	20.82	20.76	20.66	20.52	20.49	20.35	20.29	20.23	**1 Watt = 30 dBm**

MPE Prediction (802.11 n_20M)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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 peak output power at antenna input terminal:	22.78	(dBm)
Maximum peak output power at antenna input terminal:	189.6705921	(mW)
Duty cycle:	100	(%)
Maximum Pav :	189.6705921	(mW)
Antenna gain (typical):	0.73	(dBi)
Maximum antenna gain:	1.183041556	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.044663	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.044663mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2437MHz.

802.11n_20M

Cable loss = 0		Peak Power Output								
CH	**Frequency (MHz)**	**Data Rate**								**Required Limit**
		MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**	
1	**2412**	20.38	20.33	20.24	20.14	20.10	20.02	19.95	19.86	**1 Watt = 30 dBm**
6	**2437**	**22.79**	22.68	22.65	22.60	22.49	22.43	22.39	22.32	**1 Watt = 30 dBm**
11	**2462**	20.73	20.69	20.66	20.52	20.49	20.45	20.38	20.30	**1 Watt = 30 dBm**

MPE Prediction (802.11 n_20M)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

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 peak output power at antenna input terminal:	22.79	(dBm)
Maximum peak output power at antenna input terminal:	190.107828	(mW)
Duty cycle:	100	(%)
Maximum Pav :	190.107828	(mW)
Antenna gain (typical):	0.73	(dBi)
Maximum antenna gain:	1.183041556	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.044766	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.044766mW/cm2. This is below the uncontrolled exposure limit of 1mW/cm2 at 2437MHz.