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

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	13.84	0.0242	0.2500
5220	13.86	0.0243	0.2500
5240	13.72	0.0236	0.2500
5260	**13.97**	0.0249	0.2099
5300	13.64	0.0231	0.2094
5320	13.74	0.0237	0.2094

MPE Prediction (802.11a 5150~5350)

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 average output power at antenna input terminal:	13.97	(dBm)
Maximum average output power at antenna input terminal:	24.94594727	(mW)
Duty cycle:	98.6	(%)
Maximum Pav :	24.59670401	(mW)
Antenna gain (Maximum):	2.96	(dBi)
Antenna gain (linear):	1.97696964	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5260	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.0096789	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0096789 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5260MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5180	12.91	0.0195	0.2500
5220	**12.97**	0.0198	0.2500
5240	12.71	0.0187	0.2500
5260	12.83	0.0192	0.2239
5300	12.76	0.0189	0.2239
5320	12.83	0.0192	0.2239

MPE Prediction (802.11n_HT20 5150~5350)

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 average output power at antenna input terminal:	12.97	(dBm)
Maximum average output power at antenna input terminal:	19.81527026	(mW)
Duty cycle:	98.3	(%)
Maximum Pav :	19.47841066	(mW)
Antenna gain (Maximum):	2.96	(dBi)
Antenna gain (linear):	1.97696964	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5220	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm2)
Power density at predication frequency at 20 (cm) distance	0.0076649	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0076649 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5220MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5500	**13.97**	0.0249	0.2089
5580	13.84	0.0242	0.2099
5700	13.7	0.0234	0.2094

MPE Prediction (802.11a 5470~5725)

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:	13.97	(dBm)
Maximum peak output power at antenna input terminal:	24.94594727	(mW)
Duty cycle:	98.6	(%)
Maximum Pav :	24.59670401	(mW)
Antenna gain (Maximum):	2.91	(dBi)
Antenna gain (linear):	1.954339456	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5500	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0095681	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0095681 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5500MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5500	**12.97**	0.0198	0.2239
5580	12.95	0.0197	0.2234
5700	12.76	0.0189	0.2239

MPE Prediction (802.11n_HT20 5470~5725)

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:	12.97	(dBm)
Maximum peak output power at antenna input terminal:	19.81527026	(mW)
Duty cycle:	98.3	(%)
Maximum Pav :	19.47841066	(mW)
Antenna gain (Maximum):	2.91	(dBi)
Antenna gain (linear):	1.954339456	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5500	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0075771	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0075771 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5500MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	13.78	0.0239	1
5785	13.9	0.0245	1
5825	**13.97**	0.0249	1

MPE Prediction (802.11a 5725~5850)

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:	13.97	(dBm)
Maximum peak output power at antenna input terminal:	24.94594727	(mW)
Duty cycle:	98.6	(%)
Maximum Pav :	24.59670401	(mW)
Antenna gain (Maximum):	2.11	(dBi)
Antenna gain (linear):	1.625548756	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5825	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0079584	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0079584 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5825MHz.

Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)
5745	12.79	0.0190	1
5785	**12.96**	0.0198	1
5825	12.96	0.0198	1

MPE Prediction (802.11n_HT20 5725~5850)

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:	12.96	(dBm)
Maximum peak output power at antenna input terminal:	19.7696964	(mW)
Duty cycle:	98.3	(%)
Maximum Pav :	19.43361156	(mW)
Antenna gain (Maximum):	2.11	(dBi)
Antenna gain (linear):	1.625548756	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5785	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.0062879	(mW/cm^2)

Measurement Result

The predicted power density level at 20 cm is 0.0062879 mW/cm^2. This is below the uncontrolled exposure limit of 1 mW/cm^2 at 5785MHz.