MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

802.11a Max. output power

802.11a_Aux1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
36	5180	MCS0	**13.95**	**24.831**	23.98	PASS
44	5220	MCS0	13.93	24.717	23.98	PASS
48	5240	MCS0	13.69	23.388	23.98	PASS

MPE Prediction (802.11a 5150~5250)

Average output power at antenna input terminal:	13.95	(dBm)
Average output power at antenna input terminal:	24.831331	(mW)
Duty cycle:	97.46	(%)
Maximum Pav :	24.200615	(mW)
Peak Antenna gain (Maximum):	4.5	(dBi)
Peak Antenna gain (linear):	2.8183829	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.014	(mW/cm^2)

Measurement Result
The predicted power density level at 20 cm is 0.014 mW/cm2.
This is below the uncontrolled exposure limit of 1 mW/cm2 at 5180MHz.

802.11n_HT20M Max. output power

802.11n_HT20_MIMO

CH	Frequency (MHz)	Data Rate	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
36	5180	MCS8	11.04	11.33	**14.20**	**26.289**	22.47	PASS
44	5220	MCS8	10.56	11.52	14.08	25.567	22.47	PASS
48	5240	MCS8	10.86	11.4	14.15	25.994	22.47	PASS

MPE Prediction (802.11n_HT20 5150~5250)

MIMO gain= G+(10 logN)= 4.5+3.01=7.51dBm

Average output power at antenna input terminal:	14.20	(dBm)
Average output power at antenna input terminal:	26.30268	(mW)
Duty cycle:	94.53	(%)
Maximum Pav :	24.863923	(mW)
Peak Antenna gain (Maximum):	7.51	(dBi)
Peak Antenna gain (linear):	5.6363766	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5180	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.028	(mW/cm^2)

Measurement Result
The predicted power density level at 20 cm is 0.028 mW/cm2.
This is below the uncontrolled exposure limit of 1 mW/cm2 at 5180MHz.

802.11n_HT40M Max. output power

802.11n_HT40_MIMO

CH	Frequency (MHz)	Data Rate	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
			CH 0	CH 1				
38	5190	MCS8	11.91	11.48	14.71	29.584	22.47	PASS
46	5230	MCS8	11.51	12.29	**14.93**	**31.101**	22.47	PASS

MPE Prediction (802.11n_HT40 5150~5250)

MIMO gain= G+(10 logN)= 4.5+3.01= 7.51dBm

Average output power at antenna input terminal:	14.93	(dBm)
Average output power at antenna input terminal:	31.117163	(mW)
Duty cycle:	90	(%)
Maximum Pav :	28.005447	(mW)
Peak Antenna gain (Maximum):	7.51	(dBi)
Peak Antenna gain (linear):	5.6363766	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	5230	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm2)
Power density at predication frequency at 20 (cm)	0.031	(mW/cm^2)

Measurement Result
The predicted power density level at 20 cm is 0.031 mW/cm2.
This is below the uncontrolled exposure limit of 1 mW/cm2 at 5230MHz.