

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

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SGS Taiwan Ltd.

No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com

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13.3 Maximum Permissible Exposure (MPE) Evaluation

802.11b Main						
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	1	18.58	72.11	1 Watt = 30.00 dBm	PASS
6	2437	1	18.37	68.71	1 Watt = 30.00 dBm	PASS
11	2462	1	18.23	66.53	1 Watt = 30.00 dBm	PASS
802.11b Main						
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	1	16.58	45.50	1 Watt = 30.00 dBm	PASS
6	2437	1	16.54	45.08	1 Watt = 30.00 dBm	PASS
11	2462	1	16.42	43.85	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11g 2412~2462)

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

Max. output power including tune-up tolerancel:	16.58	(dBm)
Max. output power including tune-up tolerancel:	45.498806	(mW)
Duty cycle:	100	(%)
Maximum Pav :	45.498806	(mW)
Peak Antenna gain (Maximum):	2.5	(dBi)
Peak Antenna gain (linear):	1.7782794	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2462	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.016	(mW/cm ²)
Measurement Result		
The predicted power density level at 20 cm is 0.016 mW/cm ² .		
This is below the uncontrolled exposure limit of 1 mW/cm ² at 2462MHz.		

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802.11g Main						
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	6	22.11	162.55	1 Watt = 30.00 dBm	PASS
6	2437	6	21.46	139.96	1 Watt = 30.00 dBm	PASS
11	2462	6	20.01	100.23	1 Watt = 30.00 dBm	PASS

802.11g Main						
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	6	14.91	30.97	1 Watt = 30.00 dBm	PASS
6	2437	6	14.94	31.19	1 Watt = 30.00 dBm	PASS
11	2462	6	14.02	25.23	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11g 2412~2462)

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

Max. output power including tune-up tolerancel:	14.94	(dBm)
Max. output power including tune-up tolerancel:	31.188896	(mW)
Duty cycle:	100	(%)
Maximum Pav :	31.188896	(mW)
Peak Antenna gain (Maximum):	2.5	(dBi)
Peak Antenna gain (linear):	1.7782794	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.011	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.011 mW/cm².

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

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802.11n_HT20M Main						
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	MCS0	21.04	127.06	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	21.97	157.40	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	20.67	116.68	1 Watt = 30.00 dBm	PASS

802.11n_HT20M Main						
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	MCS0	14.14	25.94	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	16.44	44.06	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	14.02	25.23	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11n20 2412~2462)

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

Max. output power including tune-up tolerance:	16.44	(dBm)
Max. output power including tune-up tolerance:	44.055486	(mW)
Duty cycle:	100	(%)
Maximum Pav :	44.055486	(mW)
Peak Antenna gain (Maximum):	2.5	(dBi)
Peak Antenna gain (linear):	1.7782794	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.016	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.016 mW/cm².

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

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802.11n_HT40M Main							
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT
3	2422	MCS0	20.11	102.57	1 Watt =	30.00 dBm	PASS
6	2437	MCS0	21.92	155.60	1 Watt =	30.00 dBm	PASS
9	2452	MCS0	19.53	89.74	1 Watt =	30.00 dBm	PASS
802.11n_HT40M Main							
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT
3	2422	MCS0	13.94	24.77	1 Watt =	30.00 dBm	PASS
6	2437	MCS0	16.32	42.85	1 Watt =	30.00 dBm	PASS
9	2452	MCS0	14.51	28.25	1 Watt =	30.00 dBm	PASS

MPE Prediction (802.11g 2412~2462)

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

Max. output power including tune-up tolerance:	16.32	(dBm)
Max. output power including tune-up tolerance:	42.854852	(mW)
Duty cycle:	100	(%)
Maximum Pav :	42.854852	(mW)
Peak Antenna gain (Maximum):	2.5	(dBi)
Peak Antenna gain (linear):	1.7782794	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2437	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.015	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.015 mW/cm².

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

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