

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

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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

Member of SGS Group

1.2 Maximum Permissible Exposure (MPE) Evaluation

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	14.80	30.20	1 Watt =	30.00 dBm	PASS
6	2437	1	16.50	44.67	1 Watt =	30.00 dBm	PASS
11	2462	1	18.82	76.21	1 Watt =	30.00 dBm	PASS
802.11b Main							
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT
1	2412	1	12.62	18.28	1 Watt =	30.00 dBm	PASS
6	2437	1	14.17	26.12	1 Watt =	30.00 dBm	PASS
11	2462	1	16.6	45.71	1 Watt =	30.00 dBm	PASS

MPE Prediction (802.11b 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 tolerance1:	16.60	(dBm)
Max. output power including tune-up tolerance1:	45.708819	(mW)
Duty cycle:	100	(%)
Maximum Pav :	45.708819	(mW)
Peak Antenna gain (Maximum):	4.91	(dBi)
Peak Antenna gain (linear):	3.0974193	(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)	0.028	(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 2462MHz.

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802.11g Main

CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	6	22.41	174.18	1 Watt = 30.00 dBm	PASS
6	2437	6	24.62	289.73	1 Watt = 30.00 dBm	PASS
11	2462	6	23.9	245.47	1 Watt = 30.00 dBm	PASS

802.11g Main

CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	6	11.67	14.69	1 Watt = 30.00 dBm	PASS
6	2437	6	13.97	24.95	1 Watt = 30.00 dBm	PASS
11	2462	6	13.11	20.46	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 tolerance1:	13.97	(dBm)
Max. output power including tune-up tolerance1:	24.945947	(mW)
Duty cycle:	100	(%)
Maximum Pav :	24.945947	(mW)
Peak Antenna gain (Maximum):	4.91	(dBi)
Peak Antenna gain (linear):	3.0974193	(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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802.11n_HT20M Main						
CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	MCS0	23.33	215.28	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	23.35	216.27	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	23.31	214.29	1 Watt = 30.00 dBm	PASS

802.11n_HT20M Main						
CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	MCS0	11.68	14.72	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	12.98	19.86	1 Watt = 30.00 dBm	PASS
11	2462	MCS0	12.97	19.82	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11n_HT20 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 tolerance1:	12.98	(dBm)
Max. output power including tune-up tolerance1:	19.860949	(mW)
Duty cycle:	100	(%)
Maximum Pav :	19.860949	(mW)
Peak Antenna gain (Maximum):	4.91	(dBi)
Peak Antenna gain (linear):	3.0974193	(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)	0.012	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.012 mW/cm².

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

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802.11n_HT40M Main

CH	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
3	2422	MCS0	23.64	231.21	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	23.52	224.91	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	23.48	222.84	1 Watt = 30.00 dBm	PASS

802.11n_HT40M Main

CH	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
3	2422	MCS0	12.98	19.86	1 Watt = 30.00 dBm	PASS
6	2437	MCS0	12.92	19.59	1 Watt = 30.00 dBm	PASS
9	2452	MCS0	13.89	24.49	1 Watt = 30.00 dBm	PASS

MPE Prediction (802.11n_HT40 2422~2452)

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 tolerance1:	13.89	(dBm)
Max. output power including tune-up tolerance1:	24.490632	(mW)
Duty cycle:	100	(%)
Maximum Pav :	24.490632	(mW)
Peak Antenna gain (Maximum):	4.91	(dBi)
Peak Antenna gain (linear):	3.0974193	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2452	(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 2452MHz.

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