

Report No.: E2/2015/10036-01

Page 1 of 7

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	Electric Field	Magnetic Field	Power Density	Averaging Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(minute)
	Limits for Genera	al Population/Uncon	trolled 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

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^{* =} Plane-wave equipment power density



Report No.: E2/2015/10036-01 Page 2 of 7



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 π R²

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/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5260MHz.

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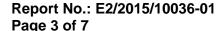
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f (886-2) 2298-0488 www.tw.sgs.com



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

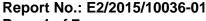
The predicted power density level at 20 cm is 0.0076649 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5220MHz.

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Page 4 of 7



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)

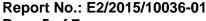
Measurement Result

The predicted power density level at 20 cm is 0.0095681 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5500MHz.

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Page 5 of 7



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)

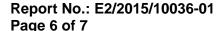
Measurement Result

The predicted power density level at 20 cm is 0.0075771 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5500MHz.

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Output Power Output Power Frequency Limit (dBm) (MHz) (W) (W)

5745 13.78 0.0239 5785 13.9 0.0245 1 13.97 1 5825 0.0249

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/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5825MHz.

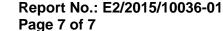
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Output Power Output Power Frequency Limit (MHz) (dBm) (W) (W) 12.79 5745 0.0190 5785 12.96 0.0198 1 1 5825 12.96 0.0198

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/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5785MHz.

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