

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

MAXIMUM PERMISSIBLE EXPOSURE (MPE) EVALUATION

802.11a 5150~5250 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5180.00 | 10.77 | 10.77 | 0.01194 | 1 |
| 5220.00 | 10.41 | 10.41 | 0.01099 | 1 |
| 5240.00 | 10.38 | 10.38 | 0.01091 | 1 |

MPE Prediction (802.11a 5150~5250)

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: | 10.77 | (dBm) |
| Maximum peak output power at antenna input terminal: | 11.93988104 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 11.93988104 | (mW) |
| Antenna gain (typical): | 4.9 | (dBi) |
| Maximum antenna gain: | 3.090295433 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5180 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0073443 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00734 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

802.11a 5250~5350 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5260.00 | 10.49 | 10.49 | 0.01119 | 1 |
| 5300.00 | 10.50 | 10.50 | 0.01122 | 1 |
| 5320.00 | 10.33 | 10.33 | 0.01079 | 1 |

MPE Prediction (802.11a 5250~5350)

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 peak output power at antenna input terminal: | 10.5 | (dBm) |
| Maximum peak output power at antenna input terminal: | 11.22018454 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 11.22018454 | (mW) |
| Antenna gain (typical): | 4.83 | (dBi) |
| Maximum antenna gain: | 3.040885026 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5300 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0067913 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00679 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5300MHz.

802.11a 5470~5725 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5500.00 | 10.36 | 10.36 | 0.01086 | 1 |
| 5580.00 | 10.24 | 10.24 | 0.01057 | 1 |
| 5700.00 | 10.21 | 10.21 | 0.01050 | 1 |

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: | 10.36 | (dBm) |
| Maximum peak output power at antenna input terminal: | 10.86425624 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 10.86425624 | (mW) |
| Antenna gain (typical): | 4.52 | (dBi) |
| Maximum antenna gain: | 2.831391996 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5500 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0061228 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00612 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5500MHz.

802.11n HT20 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5180.00 | 10.71 | 10.71 | 0.01178 | 1 |
| 5220.00 | 10.36 | 10.36 | 0.01086 | 1 |
| 5240.00 | 10.31 | 10.31 | 0.01074 | 1 |

MPE Prediction (802.11n HT20 MIMO operation (CH 0 + CH 1) 5150~5250)

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: | 10.71 | (dBm) |
| Maximum peak output power at antenna input terminal: | 11.77605974 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 11.77605974 | (mW) |
| Antenna gain (typical): | 4.9 | (dBi) |
| Maximum antenna gain: | 3.090295433 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5180 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0072435 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00724 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5180MHz.

802.11n HT20 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5260.00 | 10.53 | 10.53 | 0.01130 | 1 |
| 5300.00 | 10.46 | 10.46 | 0.01112 | 1 |
| 5320.00 | 10.32 | 10.32 | 0.01076 | 1 |

MPE Prediction (802.11n HT20 MIMO operation (CH 0 + CH 1) 5250~5350)

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 peak output power at antenna input terminal: | 10.53 | (dBm) |
| Maximum peak output power at antenna input terminal: | 11.29795915 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 11.29795915 | (mW) |
| Antenna gain (typical): | 4.83 | (dBi) |
| Maximum antenna gain: | 3.040885026 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5260 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0068383 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00684 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5260MHz.

802.11n HT20 Power Table

| Frequency (MHz) | Reading Power (dBm) | Output Power (dBm) | Output Power (W) | Limit (W) |
|-----------------|---------------------|--------------------|------------------|-----------|
| 5500.00 | 10.10 | 10.10 | 0.01023 | 1 |
| 5580.00 | 10.11 | 10.11 | 0.01026 | 1 |
| 5700.00 | 10.24 | 10.24 | 0.01057 | 1 |

MPE Prediction (802.11n HT20 MIMO operation (CH 0 + CH 1) 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: | 10.24 | (dBm) |
| Maximum peak output power at antenna input terminal: | 10.56817509 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 10.56817509 | (mW) |
| Antenna gain (typical): | 4.52 | (dBi) |
| Maximum antenna gain: | 2.831391996 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5700 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm ²) |
| Power density at predication frequency at 20 (cm) | 0.0059559 | (mW/cm ²) |

Measurement Result

The predicted power density level at 20 cm is 0.00596 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 5700MHz.