# 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

## Internal Antenna

### 802.11b Power Table

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | 16.51 | 0.00 | 16.51 | 0.04477 | 1 |
| 2437.00 | 16.35 | 0.00 | 16.35 | 0.04315 | 1 |
| 2462.00 | 16.36 | 0.00 | 16.36 | 0.04325 | 1 |

### MPE Prediction (802.11b)

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: | 16.51 | (dBm) |
| Maximum peak output power at antenna input terminal: | 44.77133042 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 44.77133042 | (mW) |
| Antenna gain (typical): | 1.8 | (dBi) |
| Maximum antenna gain: | 1.513561248 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2412 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.013488 | (mW/cm^2) |

### Measurement Result

The predicted power density level at 20 cm is 0.01349 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$ at 2412MHz.

**802.11g Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | **16.97** | 0.00 | 16.97 | 0.04977 | 1 |
| 2437.00 | 16.68 | 0.00 | 16.68 | 0.04656 | 1 |
| 2462.00 | 15.67 | 0.00 | 15.67 | 0.03690 | 1 |

**MPE Prediction (802.11g)**

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: | 16.97 | (dBm) |
| Maximum peak output power at antenna input terminal: | 49.7737085 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 49.7737085 | (mW) |
| Antenna gain (typical): | 1.8 | (dBi) |
| Maximum antenna gain: | 1.513561248 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2412 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.014995 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01500 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412.

**802.11n_20M (2.4G) MIMO Chain 0+Chain 1Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | 15.08 | 0.00 | 15.08 | 0.03221 | 1 |
| 2437.00 | **18.16** | 0.00 | 18.16 | 0.06546 | 1 |
| 2462.00 | 15.13 | 0.00 | 15.13 | 0.03258 | 1 |

**MPE Prediction (802.11n_20M (2.4G))**

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: | 18.16 | (dBm) |
| Maximum peak output power at antenna input terminal: | 65.46361741 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 65.46361741 | (mW) |
| Antenna gain (typical): | 4.8 | (dBi) |
| Maximum antenna gain: | 3.01995172 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2437 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.039351 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.03935 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437.

**802.11n_40M (2.4G) MIMO Chain 0+Chain 1Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2422.00 | 13.20 | 0.00 | 13.20 | 0.02089 | 1 |
| 2437.00 | **13.72** | 0.00 | 13.72 | 0.02355 | 1 |
| 2452.00 | 12.91 | 0.00 | 12.91 | 0.01954 | 1 |

**MPE Prediction (802.11n_40M (2.4G))**

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: | 13.72 | (dBm) |
| Maximum peak output power at antenna input terminal: | 23.55049284 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 23.55049284 | (mW) |
| Antenna gain (typical): | 4.8 | (dBi) |
| Maximum antenna gain: | 3.01995172 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2437 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.014156 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01416 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437.

**802.11a Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5745.00 | 14.20 | 0.00 | 14.20 | 0.02630 | 1 |
| 5785.00 | 13.98 | 0.00 | 13.98 | 0.02500 | 1 |
| 5825.00 | **14.52** | 0.00 | 14.52 | 0.02831 | 1 |

**MPE Prediction (802.11a)**

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: | 14.52 | (dBm) |
| Maximum peak output power at antenna input terminal: | 28.31391996 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 28.31391996 | (mW) |
| Antenna gain (typical): | 4.97 | (dBi) |
| Maximum antenna gain: | 3.140508694 | (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) | 0.017699 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01770 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5825.

**802.11n_20M (5GHz) MIMO Chain 0+ Chain1 Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5745.00 | 16.87 | 0.00 | 16.87 | 0.04864 | 1 |
| 5785.00 | 17.02 | 0.00 | 17.02 | 0.05035 | 1 |
| 5825.00 | **17.08** | 0.00 | 17.08 | 0.05105 | 1 |

**MPE Prediction (802.11a)**

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: | 17.08 | (dBm) |
| Maximum peak output power at antenna input terminal: | 51.0505 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 51.0505 | (mW) |
| Antenna gain (typical): | 6.82 | (dBi) |
| Maximum antenna gain: | 4.808393484 | (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) | 0.048860 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.04886 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5825.

**802.11n_40M (5GHz) MIMO Chain 0+ Chain1 Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5755.00 | 15.56 | 0.00 | 15.56 | 0.03597 | 1 |
| 5795.00 | **15.62** | 0.00 | 15.62 | 0.03648 | 1 |

**MPE Prediction (802.11a)**

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: | 15.62 | (dBm) |
| Maximum peak output power at antenna input terminal: | 36.47539469 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 36.47539469 | (mW) |
| Antenna gain (typical): | 6.82 | (dBi) |
| Maximum antenna gain: | 4.808393484 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5795 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.034910 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.03491 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5795.

**External Antenna**

**802.11b Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | 16.51 | 0.00 | 16.51 | 0.04477 | 1 |
| 2437.00 | 16.35 | 0.00 | 16.35 | 0.04315 | 1 |
| 2462.00 | 16.36 | 0.00 | 16.36 | 0.04325 | 1 |

**MPE Prediction (802.11b)**

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: | 16.51 | (dBm) |
| Maximum peak output power at antenna input terminal: | 44.77133042 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 44.77133042 | (mW) |
| Antenna gain (typical): | 2.98 | (dBi) |
| Maximum antenna gain: | 1.986094917 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2412 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.017699 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.00177 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$ at 2412MHz.

**802.11g Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | **16.97** | 0.00 | 16.97 | 0.04977 | 1 |
| 2437.00 | 16.68 | 0.00 | 16.68 | 0.04656 | 1 |
| 2462.00 | 15.67 | 0.00 | 15.67 | 0.03690 | 1 |

**MPE Prediction (802.11g)**

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: | 16.97 | (dBm) |
| Maximum peak output power at antenna input terminal: | 49.7737085 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 49.7737085 | (mW) |
| Antenna gain (typical): | 2.98 | (dBi) |
| Maximum antenna gain: | 1.986094917 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2412 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.019677 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01968mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412.

**802.11n_20M (2.4G) MIMO Chain 0+Chain 1Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2412.00 | 15.08 | 0.00 | 15.08 | 0.03221 | 1 |
| 2437.00 | **18.16** | 0.00 | 18.16 | 0.06546 | 1 |
| 2462.00 | 15.13 | 0.00 | 15.13 | 0.03258 | 1 |

**MPE Prediction (802.11n_20M (2.4G))**

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: | 18.16 | (dBm) |
| Maximum peak output power at antenna input terminal: | 65.46361741 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 65.46361741 | (mW) |
| Antenna gain (typical): | 5.98 | (dBi) |
| Maximum antenna gain: | 3.962780343 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2437 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.051636 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.05164 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437.

**802.11n_40M (2.4G) MIMO Chain 0+Chain 1Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 2422.00 | 13.20 | 0.00 | 13.20 | 0.02089 | 1 |
| 2437.00 | **13.72** | 0.00 | 13.72 | 0.02355 | 1 |
| 2452.00 | 12.91 | 0.00 | 12.91 | 0.01954 | 1 |

**MPE Prediction (802.11n_40M (2.4G))**

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: | 13.72 | (dBm) |
| Maximum peak output power at antenna input terminal: | 23.55049284 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 23.55049284 | (mW) |
| Antenna gain (typical): | 5.98 | (dBi) |
| Maximum antenna gain: | 3.962780343 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 2437 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.018576 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01858 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 2437.

**802.11a Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5745.00 | 14.20 | 0.00 | 14.20 | 0.02630 | 1 |
| 5785.00 | 13.98 | 0.00 | 13.98 | 0.02500 | 1 |
| 5825.00 | **14.52** | 0.00 | 14.52 | 0.02831 | 1 |

**MPE Prediction (802.11a)**

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: | 14.52 | (dBm) |
| Maximum peak output power at antenna input terminal: | 28.31391996 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 28.31391996 | (mW) |
| Antenna gain (typical): | 4.85 | (dBi) |
| Maximum antenna gain: | 3.054921113 | (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) | 0.017217 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.01722 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5825.

**802.11n_20M (5GHz) MIMO Chain 0+ Chain1 Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5745.00 | 16.87 | 0.00 | 16.87 | 0.04864 | 1 |
| 5785.00 | 17.02 | 0.00 | 17.02 | 0.05035 | 1 |
| 5825.00 | **17.08** | 0.00 | 17.08 | 0.05105 | 1 |

**MPE Prediction (802.11a)**

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: | 17.08 | (dBm) |
| Maximum peak output power at antenna input terminal: | 51.0505 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 51.0505 | (mW) |
| Antenna gain (typical): | 7.85 | (dBi) |
| Maximum antenna gain: | 6.095368972 | (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) | 0.061937 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.06194 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5825.

**802.11n_40M (5GHz) MIMO Chain 0+ Chain1 Power Table**

| Frequency (MHz) | Reading Power (dBm) | Cable Loss | Output Power (dBm) | Output Power (W) | Limit (W) |
|---|---|---|---|---|---|
| 5755.00 | 15.56 | 0.00 | 15.56 | 0.03597 | 1 |
| 5795.00 | **15.62** | 0.00 | 15.62 | 0.03648 | 1 |

**MPE Prediction (802.11a)**

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: | 15.62 | (dBm) |
| Maximum peak output power at antenna input terminal: | 36.47539469 | (mW) |
| Duty cycle: | 100 | (%) |
| Maximum Pav : | 36.47539469 | (mW) |
| Antenna gain (typical): | 7.85 | (dBi) |
| Maximum antenna gain: | 6.095368972 | (numeric) |
| Prediction distance: | 20 | (cm) |
| Prediction frequency: | 5795 | (MHz) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.044254 | (mW/cm^2) |

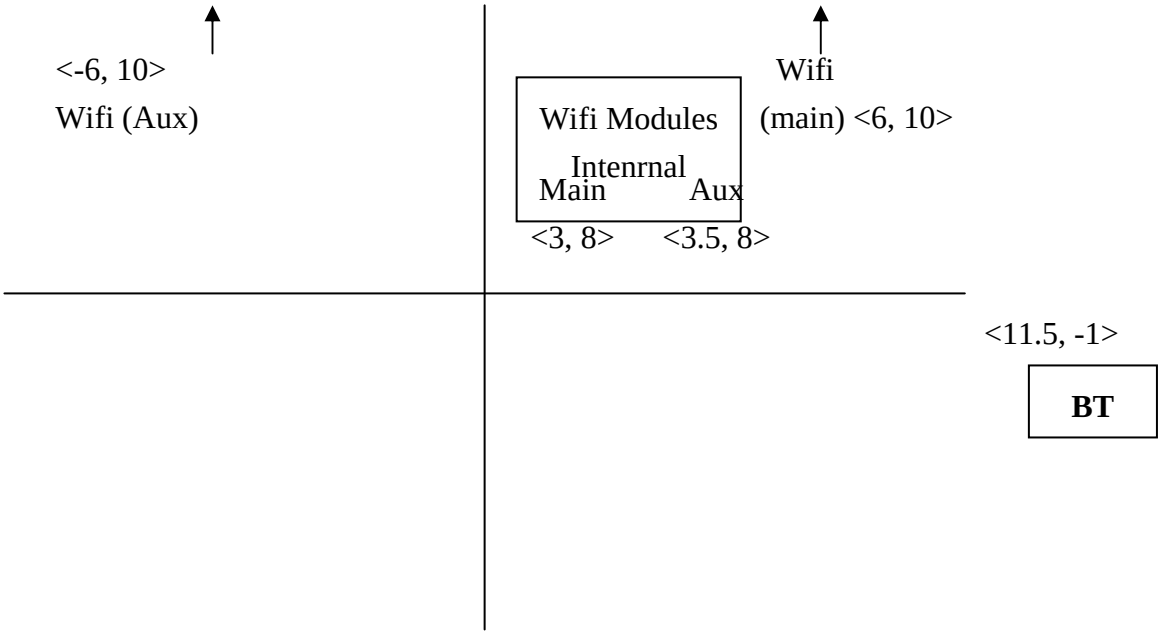
**Measurement Result**

The predicted power density level at 20 cm is 0.04425 mW/cm2. This is below the uncontrolled exposure limit of 1 mW/cm2 at 5795.

Collocated MPE analysis:

As per KDB447498 D01, if the radio application is composed of the multiple transmitters confining in the host plateform, and placing nearby, the simultaneous transmission due to impact of accumulation of individual MPE shall be evaluated if or not given application could conditionally qualify for MPE test exclusion.

**Location of the transmitting antennas where they distribute:**




Scenario of operation when simultaneous transmission occurs:

Scenario 1:
External Antenna:
Wifi b or g + Bluetooth
Scenario 2:
External Antenna:
Wifi n_MIMO + Bluetooth

Scenario 3:
External Antenna:
Wifi a + Bluetooth
Scenario 4:
External Antenna:
Wifi n_5G (MIMO) + Bluetooth

Scenario 5:
Internal Antenna:
Wifi b or g + Bluetooth
Scenario 6:
Internal Antenna:
Wifi n_MIMO + Bluetooth

Scenario 7:
Internal Antenna:
Wifi a + Bluetooth

Scenario 8:
Internal Antenna:
Wifi n 5G_MIMO + Bluetooth

Exclusion of test condition:
*Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0.*

*∑MPE ratio1 + MPE ratio2+MPE ration <=1.0*
*The spreadsheet as FCC deduces, and releases is employed to conduct the measurement:*

*Scenario 1:*

External Antenna:
Wifi b or g + Bluetooth

| Antenna No. | | Total | 1 | 2 |
|---|---|---|---|---|
| Tx Status | | | On | On |
| Frequency | MHz | | 2412 | 2402 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 |
| Max % MPE | % | 1.8 | 0.9 | 0.0 |
| Power | (W) | 0.042 | 0.024 | 0.002 |
| Antenna Gain | dBi | | 2.98 | 1.20 |
| EIRP | (W) | 0.10 | 0.048 | 0.002 |
| X | (cm) | | 6.0 | 11.5 |
| Y | (cm) | | 10.0 | -1.0 |
| Sector | | | FALSE | FALSE |
| Arc | | | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |

MPE = 1.8/100 = 0.018 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 2:*

External Antenna:
Wifi n_MIMO + Bluetooth

| Antenna No. | | Total | 1 | 2 | 3 |
|---|---|---|---|---|---|
| Tx Status | | | On | On | On |
| Frequency | MHz | | 2437 | 2402 | 2437 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 | 1.00 |
| Max % MPE | % | 1.2 | 0.6 | 0.0 | 0.6 |
| Power | (W) | 0.031 | 0.015 | 0.002 | 0.014 |
| Antenna Gain | dBi | | 2.98 | 1.20 | 2.98 |
| EIRP | (W) | 0.06 | 0.030 | 0.002 | 0.028 |
| X | (cm) | | 6.0 | 11.5 | -6.0 |
| Y | (cm) | | 10.0 | -1.0 | 10.0 |
| Sector | | | FALSE | FALSE | FALSE |
| Arc | | | FALSE | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |

MPE = 1.2/100 = 0.012 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 3:*
External Antenna:
Wifi a + Bluetooth

| Antenna No. | | Total | 1 | 2 |
|---|---|---|---|---|
| Tx Status | | | On | On |
| Frequency | MHz | | 5260 | 2402 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 |
| Max % MPE | % | 1.1 | 1.1 | 0.0 |
| Power | (W) | 0.020 | 0.018 | 0.002 |
| Antenna Gain | dBi | | 4.85 | 1.20 |
| EIRP | (W) | 0.06 | 0.055 | 0.002 |
| X | (cm) | | 6.0 | 11.5 |
| Y | (cm) | | 10.0 | -1.0 |
| Sector | | | FALSE | FALSE |
| Arc | | | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |

MPE = 1.1/100 = 0.011 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 4:*
External Antenna:
Wifi n_MIMO 5G + Bluetooth

| Antenna No. | | Total | 1 | 2 | 3 |
|---|---|---|---|---|---|
| Tx Status | | | On | On | On |
| Frequency | MHz | | 5260 | 2402 | 5260 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 | 1.00 |
| Max % MPE | % | 1.9 | 1.1 | 0.0 | 1.0 |
| Power | (W) | 0.036 | 0.018 | 0.002 | 0.016 |
| Antenna Gain | dBi | | 4.85 | 1.20 | 4.85 |
| EIRP | (W) | 0.11 | 0.055 | 0.002 | 0.049 |
| X | (cm) | | 6.0 | 11.5 | -6.0 |
| Y | (cm) | | 10.0 | -1.0 | 10.0 |
| Sector | | | FALSE | FALSE | FALSE |
| Arc | | | FALSE | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |

MPE = 1.9/100 = 0.019 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 5:

Internal Antenna:

Wifi b or g + Bluetooth

| Antenna No. | | Total | 1 | 2 |
|---|---|---|---|---|
| Tx Status | | | On | On |
| Frequency | MHz | | 2412 | 2402 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 |
| Max % MPE | % | 0.7 | 0.7 | 0.0 |
| Power | (W) | 0.026 | 0.024 | 0.002 |
| Antenna Gain | dBi | | 1.80 | 1.20 |
| EIRP | (W) | 0.04 | 0.036 | 0.002 |
| X | (cm) | | 6.0 | 11.5 |
| Y | (cm) | | 10.0 | -1.0 |
| Sector | | | FALSE | FALSE |
| Arc | | | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |

MPE = 0.7/100 = 0.007 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 6:*

Internal Antenna:

Wifi n_MIMO + Bluetooth

| Antenna No. | | Total | 1 | 2 | 3 |
|---|---|---|---|---|---|
| Tx Status | | | On | On | On |
| Frequency | MHz | | 2412 | 2402 | 2412 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 | 1.00 |
| Max % MPE | % | 2.7 | 1.0 | 0.0 | 1.9 |
| Power | (W) | 0.067 | 0.033 | 0.002 | 0.032 |
| Antenna Gain | dBi | | 1.80 | 1.20 | 4.85 |
| EIRP | (W) | 0.15 | 0.050 | 0.002 | 0.098 |
| X | (cm) | | 6.0 | 11.5 | -6.0 |
| Y | (cm) | | 10.0 | -1.0 | 10.0 |
| Sector | | | FALSE | FALSE | FALSE |
| Arc | | | FALSE | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |

MPE = 2.7/100 = 0.027 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 7:*
Internal Antenna:
Wifi a + Bluetooth

| Antenna No. | | Total | 1 | 2 |
|---|---|---|---|---|
| Tx Status | | | On | On |
| Frequency | MHz | | 5260 | 2402 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 |
| Max % MPE | % | 0.6 | 0.5 | 0.0 |
| Power | (W) | 0.020 | 0.018 | 0.002 |
| Antenna Gain | dBi | | 1.80 | 1.20 |
| EIRP | (W) | 0.03 | 0.027 | 0.002 |
| X | (cm) | | 6.0 | 11.5 |
| Y | (cm) | | 10.0 | -1.0 |
| Sector | | | FALSE | FALSE |
| Arc | | | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 |
| $\theta_2$ | | | 60 | 60 |

MPE = 0.6 /100 = 0.006 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

*Scenario 8:*
Internal Antenna:
Wifi n_5G_MIMO + Bluetooth

| Antenna No. | | Total | 1 | 2 | 3 |
|---|---|---|---|---|---|
| Tx Status | | | On | On | On |
| Frequency | MHz | | 5260 | 2402 | 5260 |
| MPE Limit | $mW/cm^2$ | | 1.00 | 1.00 | 1.00 |
| Max % MPE | % | 2.0 | 1.1 | 0.0 | 1.0 |
| Power | (W) | 0.036 | 0.018 | 0.002 | 0.016 |
| Antenna Gain | dBi | | 4.97 | 1.20 | 4.97 |
| EIRP | (W) | 0.11 | 0.057 | 0.002 | 0.050 |
| X | (cm) | | 6.0 | 11.5 | -6.0 |
| Y | (cm) | | 10.0 | -1.0 | 10.0 |
| Sector | | | FALSE | FALSE | FALSE |
| Arc | | | FALSE | FALSE | FALSE |
| $\theta_1$ | degs | input | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |
| $\theta_1$ | | actual | -120 | -120 | -120 |
| $\theta_2$ | | | 60 | 60 | 60 |

MPE = 2/100 = 0.02 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.