**ID: YOR-RT1900AC**

# 1. 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 §2.1091 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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## Maximum Permissible Exposure (MPE) Evaluation

### 2.4GHz mode:

The worst case of Average power: refer to FCC test report for detail measurement date.

Power measurement:

802.11b

| Cable loss = 0 | | Output Power | | Limit (dBm) |
|---|---|---|---|---|
| CH | Frequency (MHz) | Detector | | |
| | | PK (dBm) | AV (dBm) | |
| 1 | 2412 | 18.16 | 14.36 | 30 |
| 6 | 2437 | 19.21 | 15.44 | |
| 11 | 2462 | 18.12 | 14.25 | |

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 AV output power at antenna input terminal: | 15.44 | (dBm) |
| Power Tolerance: | 2.00 | dB |
| Maximum AV output power at antenna input terminal: | 55.46 | (mW) |
| Duty cycle: | 100.00 | (%) |
| Maximum Pav : | 55.46 | (mW) |
| Antenna gain (typical): | 3.63 | (dBi) |
| Maximum antenna gain: | 2.31 | (numeric) |
| Prediction distance: | 20.00 | (cm) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1.00 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.0255 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.0255 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$.

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**5150MHz – 5250MHz Mode:**

The worst case of Average power N HT20 mode: refer to FCC test report for detail measurement date.

Power measurement:

3*3 MIMO

| Mode | Freq(MHz) | channel | Output Chain (dBm) | | | Combine Output Power (dBm) | Limit(dBm) | Result |
|---|---|---|---|---|---|---|---|---|
| | | | chain A | chain B | chain C | | | |
| N HT20 | 5170 | 34 | 7.25 | 7.57 | 7.66 | 12.27 | 29 | Pass |
| | 5200 | 40 | 8.32 | 7.00 | 7.92 | 12.55 | 29 | Pass |
| | 5240 | 48 | 8.27 | 6.78 | 7.54 | 12.34 | 29 | Pass |

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 AV output power at antenna input terminal: | 12.55 | (dBm) |
| Power Tolerance: | 2.00 | dB |
| Maximum AV output power at antenna input terminal: | 28.51 | (mW) |
| Duty cycle: | 100.00 | (%) |
| Maximum Pav : | 28.51 | (mW) |
| Antenna gain (typical): | 6.12 | (dBi) |
| Maximum antenna gain: | 4.09 | (numeric) |
| Prediction distance: | 20.00 | (cm) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1.00 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.0232 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.0232 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$.

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**5725MHz – 5850MHz Mode:**

The worst case of Average power N HT40 mode: refer to FCC test report for detail measurement date.

Power measurement:

3*3 MIMO

| Mode | Freq(MHz) | channel | Output Chain (dBm) | | | Combine Output Power (dBm) | Limit(dBm) | Result |
|---|---|---|---|---|---|---|---|---|
| | | | Chain A | chain B | Chain C | | | |
| N HT20 | 5745 | 149 | 9.98 | 9.21 | 7.70 | 13.83 | 29 | |
| | 5785 | 157 | 9.92 | 9.05 | 7.53 | 13.71 | 29 | Pass |
| | 5825 | 165 | 9.85 | 8.54 | 7.49 | 13.51 | 29 | Pass |

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 AV output power at antenna input terminal: | 13.83 | (dBm) |
| Power Tolerance: | 2.00 | dB |
| Maximum AV output power at antenna input terminal: | 38.28 | (mW) |
| Duty cycle: | 100.00 | (%) |
| Maximum Pav : | 38.28 | (mW) |
| Antenna gain (typical): | 6.12 | (dBi) |
| Maximum antenna gain: | 4.09 | (numeric) |
| Prediction distance: | 20.00 | (cm) |
| | | |
| MPE limit for uncontrolled exposure at prediction | 1.00 | (mW/cm2) |
| Power density at predication frequency at 20 (cm) | 0.0312 | (mW/cm^2) |

**Measurement Result**

The predicted power density level at 20 cm is 0.0312 $mW/cm^2$. This is below the uncontrolled exposure limit of 1 $mW/cm^2$.

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**Simultaneous transmissions:**
**2.4GHz + 5725MHz – 5850MHz mode:**

$0.0255 + 0.0312 = 0.0567$ mW/cm$^2$.

The predicted power density level at 20 cm is 0.0567 mW/cm$^2$. This is below the uncontrolled exposure limit of 1 mW/cm$^2$.

***~ End of Report ~***