§1.1307(b)(1) & §2.1093 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

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
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication 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: 17.27 (dBm)
Maximum peak output power at antenna input terminal: 53.33 (mW)
Prediction distance: 20 (cm)
Predication frequency: 2400 (MHz)

1. WISP 24013-120PTNF, 13dBi 120 Degree, Sector Panel, Antenna Gain (typical): 13 (dBi)
antenna gain: 19.95 (numeric)
Minimum safe distance at predication frequency : 9.2 cm

2. WISP 24014-90PTNF, 14dBi 90 Degree, Sector Panel, Antenna Gain (typical): 14 (dBi)
antenna gain: 25.12 (numeric)
Minimum safe distance at predication frequency : 10.33 cm

3. PAWOD24-12, 12dBi Omni Directional, Antenna Gain (typical): 12 (dBi)
antenna gain: 15.85 (numeric)
Minimum safe distance at predication frequency : 8.2 cm

4. PAWSA24-16, 16.5dBi Horizontally Polarised 90 Degree Sector, Antenna Gain (typical): 16.5 (dBi)

antenna gain: 44.67 (numeric)
Minimum safe distance at predication frequency : 13.77 cm

5. PAWODH24-13, 13dBi Horizontally Polarized Sector, Antenna Gain (typical): 13 (dBi)
antenna gain: 19.95 (numeric)
Minimum safe distance at predication frequency : 9.2 cm

6. PAWSA24-17, 17dBi Vertically Polarized 90 Degree Sector, Antenna Gain (typical): 17 (dBi)
antenna gain: 50.12 (numeric)
Minimum safe distance at predication frequency : 14.58 cm

7. PAWSA24-16, 16.5 dBi Vertically Polarized 120 Degree Sector, Antenna Gain (typical): 16.5 (dBi)
antenna gain: 44.67 (numeric)
Minimum safe distance at predication frequency : 13.77 cm

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)

Test Result

The required minimum safe distance is at least 20 cm from the body of any user or nearby persons.

MPE Prediction

For antenna WISP24024 PINF, 24 dBi Parabolic Grid and antenna PAWDC24-HD-PFIP, 24 dBi Die Cast, the maximum peak power at the antenna input terminal reduced to 16.2 dBm [41.6mW].

Predication 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: 16.2 (dBm)
Maximum peak output power at antenna input terminal: 41.6 (mW)
Prediction distance: 20 (cm)
Predication frequency: 2400 (MHz)

1. WISP 24024 PTNF, 24 dBi Parabolic Grid, Antenna Gain (typical): 24 (dBi)
antenna gain: 251.19 (numeric)
Minimum safe distance at predication frequency : 8.92 cm

2. PAWDC24-HD-PFIP, 24 dBi Die Cast, Antenna Gain (typical): 24 (dBi)
antenna gain: 251.19 (numeric)
Minimum safe distance at predication frequency : 8.92 cm

Test Result

The required minimum safe distance is at least 20 cm from the body of any user or nearby persons.