RF Exposure Compliance Requirements
Integra-TR Telemetry Radio Modem

FCC Rule: 1.1307, 1.1310, 2.1091 (b) (d), 2.1093

IC Rule: RSS-102 Section 4.2

Description of Compliance:

The Integra-TR will be professionally installed in the SCADA (Supervisory Control And Data Acquisition) market and will be mounted with a fixed RTU (Remote Terminal Unit). A minimum separation distance listed in the table below must be maintained between the radiating structure and any person to classify as a mobile under FCC MPE regulations.

Antenna Gain vs. Recommended Safety Distance

	Antenna Gain		
	5 dBi	10 dBi	15 dBi
Min Safety Distance (max power)	.79 m	1.41 m	2.51 m

Note: It is the responsibility of the user to guarantee compliance with the FCC MPE regulations when operating this device in a way other than described above.

The calculation for the more stringent specification, a General Population/Uncontrolled Mobile device is shown below:

RF Limits for Devices used by the General Public

Frequency Range (MHz)	Electric Field (V/M rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Time Average (min)
0.003-1	280	2.19	-	6
1-10	280 / f	2.19 / f	-	6
10-30	28	2.19 / f	-	6
30-300	28	0.073	2*	6
300-1 500	1.585 $f^{0.5}$	0.0042 $f^{0.5}$	f / 150	6
1 500-15 000	61.4	0.163	10	6
15 000-150 000	61.4	0.163	10	616 000 / $f^{1.2}$
150 000-300 000	0.158 $f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	616 000 / $f^{1.2}$

Environmental Specification: $2W/m^2$

$S = (PG)/(4\pi R^2)$ (OET Bulletin 65)

Where:

S = Power Density (mW/cm^2)
P = Power input to the antenna (mW)
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 (cm)

Distance Calculation for 5dBi antenna:

$R = \sqrt{((PG)/(4\pi S))}$

Typical Antenna Gain: 5 dBi $10^{(5\ dBi/10)} = 3.16$
Power input to the Antenna: 37dBm = $10^{(37dBm/10)} = 5$ W

$R = \sqrt{((5W*3.16)/(4\pi*2\ W/m^2))} = .79$ m (Minimum Distance)

Distance Calculation for 10dBi antenna:

$R = \sqrt{((PG)/(4\pi S))}$

Typical Antenna Gain: 10.0 dBi $10^{(10.0\ dBi/10)} = 10.0$
Power input to the Antenna: 37dBm = $10^{(37dBm/10)} = 5$ W

$R = \sqrt{((5W*10.0)/(4\pi*2\ W/m^2))} = 1.41$ m (Minimum Distance)

Distance Calculation for 15dBi antenna:

$R = \sqrt{((PG)/(4\pi S))}$

Typical Antenna Gain: 15.0 dBi $10^{(15.0\ dBi/10)} = 31.6$
Power input to the Antenna: 37dBm = $10^{(37dBm/10)} = 5$ W

$R = \sqrt{((5W*31.6)/(4\pi*2\ W/m^2))} = 2.51$ m (Minimum Distance)