Radio Frequency Safety

As per Section 1.1310 transmitters are required to be operated in a manner that ensures the public is not exposed to RF energy levels in accordance with OST/OET Bulletin Number 65.

Calculations have been made using the General Public/Uncontrolled Exposure limits.

Minimum safe distances have been calculated below.

Power density, $mW/m^2 = E^2/3770$
- General Population / Uncontrolled exposure limit will be 0.504 mW/m^2
(f/1500 = 757 MHz/1500)

As 757 MHz is the lowest frequency in the lowest band of operation in USA, this frequency has been used to give a worst case result.

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in metres:

E, V/m = (√ (30 * P * G)) / d

Uncontrolled
$E = 0.504\ mW/m^2 = E^2/3770$

E= √ 0.504*3770

E = 43.6 V/m

The rated maximum transmitter power = +24 dBm or 0.25 watts.
A duty cycle of 100% as the transmitter is a base station could possibly be operated for long periods of time.
The client has declared that this transmitter can be operated using a range of antennas with various gains, as detailed in the table below.

Antenna Type	Gain (dBi)	Max Gain (G)	Safe Distance (Metres)	Safe Distance (cm)
Panel Antenna	12.0	15.85	0.250	25.0
	9.0	7.94	0.177	17.7
Sectored	10.0	10.00	0.198	19.8
Low Profile	8.0	6.31	0.158	15.8
Omni	2.8	1.91	0.086	8.6
	5.0	3.16	0.111	11.1
	8.0	6.31	0.158	15.8

A sample calculation for the safe distance would be:

d = √ (30 * P * G*DC) / E

d = √ (30 * 0.25 * 15.85 * 1.0) / 30.9

d = 0.559 metres or 55.9 cm

Result: Complies if the safe distances defined above are applied.