RF Exposure Requirements

The EUT is considered as a mobile device. Therefore the Electromagnetic Field Strength (E) was calculated and compared with FCC Maximum Permissive Exposure (MPE) limit. The Power Density (S) can be calculated using the formula

$$S = (30 \times EIRP) / (120 \times \pi) / D2 \quad (W/m2)$$

The maximum EIRP in dBm equal P + G –cl= 35.6 + 5 –2=38.6 dBm or 7.24 W.

Therefore, $S = 0.576 / D2$ (W/m2)

The Duty Cycle can be taking into account.

$$S = 0.576 \times DC / D^2$$

According Microburst protocol, the worst case of Duty Cycle (DC) is 16.7%, (e.g. the transmitter in ON for 3 s, and OFF for 15 s). However, in practice in back-up mode, once an hour the resulting transmitter DC would be approximately 0.08%.

In the Table below is shown the MPE calculated data for different distances, for DC=0.167, DC=0.0008, and the FCC Limit, which for uncontrolled environment equal F/1500 (mW/cm^2) or F/150 (W/m^2) where F is a frequency in MHz.

F=836.5 MHz

Distance. m	Calculated S, W/m^2 DC=0.167	Calculated S, W/m^2 DC=0.0008	MPE Limit W/m^2
0.1	9.62	0.046	5.58
0.2	2.40	0.012	5.58
0.3	1.07	0.005	5.58
0.4	0.60	0.003	5.58
0.5	0.38	0.002	5.58

For a 16.7% Duty Cycle the power density at a distance of 0.2 meters is 3.6 dB below the MPE limit. Therefore, to comply with MPE requirements, the maximum permissible antenna gain shall not exceed 8.6 dBi.

In actual usage environment in backup mode as justified by customer the duty cycle would be approximately 0.08%. The calculated Power density is 0.012 W/m^2. This is 26.7 dB below the MPE limit of 5.58 W/m^2. The maximum permissible antenna gain shall be 31.7 dBi.