MPE Calculation

Product: Master Light Controller
Model: GC1338-LR
Brand: gridComm

Evaluation according 47 CFR 1.1310 limit for 300 to 1500 MHz which is < f (MHz)/1500 mW/cm^2 and for > 1500 MHz which is < 1 mW/cm^2: The highest frequency of each band is taken to calculate the worst case limit:

LR RF module operating in the 903-927 MHz band:
Power Density calculation is not applicable under rule-part 15.249

GSM-GPRS 850 band, worst case:

Frequency range: **824.2-848.2** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 848.2 MHz: S ≤ 0.5654 mW/cm^2

Maximum measured conducted power (Average): $P_{conducted}$ = **26** dBm = 398.11 mW

Antenna Gain: G = **1** dBi = 1.26 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 26 dBm + 1 dBi = 27 dBm = 501.19 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 501.19 / 5026 = 0.0997 mW/cm^2 < 0.5654 mW/cm^2

GSM-GPRS 1900 PCS band, worst case:

Frequency range: **1850.2-1909.8** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 1909.8 MHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Average): $P_{conducted}$ = **22** dBm = 158.49 mW

Antenna Gain: G = **1** dBi = 1.26 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 22 dBm + 1 dBi = 23 dBm = 199.53 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 199.53 / 5026 = 0.0397 mW/cm^2 < 1 mW/cm^2

WCDMA-HSPA 850, worst case:

Frequency range: **824.0-849.0** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 849.0 MHz: S ≤ 0.566 mW/cm^2

Maximum measured conducted power (Average): $P_{conducted}$ = **25** dBm = 316.23 mW

Antenna Gain: G = **1** dBi = 1.26 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 25 dBm + 1 dBi = 26 dBm = 398.11 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 398.11 / 5026 = 0.0792 mW/cm^2 < 0.566 mW/cm^2

WCDMA-HSPA 1900 PCS band, worst case:

Frequency range: **1850.0-1910.0** MHz Typical use distance: d ≥ 20 cm

Power density limit for mobile devices at 1910.0 MHz: S ≤ 1 mW/cm^2

Maximum measured conducted power (Average): $P_{conducted}$ = **25** dBm = 316.23 mW

Antenna Gain: G = **1** dBi = 1.26 on the linear scale

Calculation: $P_{radiated} = P_{conducted} + G_{linear}$ = 25 dBm + 1 dBi = 26 dBm = 398.11 mW

Power density S = $(P_{radiated}) / (4\pi \times d^2)$ = 398.11 / 5026 = 0.0792 mW/cm^2 < 1 mW/cm^2

Note that only 1 of the cellular modes above can transmit at the same time.

For the worst case of simultaneous transmission, when the worst case cellular power density is summed with the LR RF module emissions under 15.249, the power density remains within the limit when the user keeps a distance of 20 cm from the device while using the device, since the power density from LR RF module under 15.249 does not add up to the total Power Density.