

Appendix A: RF Exposure

MPE Co-location Calculations

The maximum permissible RF exposure for an uncontrolled environment is specified in FCC 1.1310 table 1B.

From OET 65, $S = \text{EIRP} / 4\pi R^2$

where:

S = Power density (mW/cm^2)

EIRP = Equivalent Isotropic Radiated Power

R = 20 cm separation distance

Power density for Zwave FCC ID: YL6-143460L

For the above device operating at 908.4 MHz, the MPE limit for uncontrolled environments is $0.6 \text{ mW}/\text{cm}^2$.

EUT fundamental field strength at 908.4 MHz = 87.0 dBuV/m at 3 meters

$S = 0.00003 \text{ mW}/\text{cm}^2 =$ at 20 cm separation

Power density for Image Sensor FCC ID: YL6-143IS205V4

For the above device operating at 912 - 924 MHz, the MPE limit for uncontrolled environments is $0.6 \text{ mW}/\text{cm}^2$.

EIRP = 16 mW

$S = 0.0032 \text{ mW}/\text{cm}^2 =$ at 20 cm separation

Power density for FCC ID: 2AAGMVZ120Q

For the above device operating in LTE Band 13 (700 MHz), the MPE limit for uncontrolled environments is $0.5 \text{ mW}/\text{cm}^2$

Worst case conducted power is 0.18 W (from grant)

Maximum antenna gain for this frequency range of operation is 5 dBi / 3.2 numeric (Alarm.com antenna specification for this specific host)

$S = 0.1 \text{ mW}/\text{cm}^2 =$ at 20 cm separation

For the above device operating in LTE Band 4 (1700 MHz), the MPE limit for uncontrolled environments is $1 \text{ mW}/\text{cm}^2$.

Worst case conducted power is 0.16 W (from grant)

Maximum antenna gain for this frequency range of operation is 5 dBi / 3.2 numeric (Alarm.com antenna specification for this specific host)

$S = 0.1 \text{ mW}/\text{cm}^2 =$ at 20 cm separation

Co-location Case #1 - Summary of MPE FCC ID: YL6-143460L + YL6-143IS205V4 + 2AAGMVZ120Q

Frequency (MHz)	MPE Result (mW/cm ²)	Limit (mW/cm ²)
908.4	0.00003	0.6
912 - 924	0.0032	0.6
779.5 – 784.5 (LTE Band 13)*	0.1	0.5

* though the power density for both LTE bands is approximately the same, Band 13 is used for the power density aggregate calculation as it has the more stringent limit

MPE(1)	MPE(2)	MPE(3)	MPE Power Density Aggregate MPE(1) + MPE(2) + MPE(3) < 0.5 (mW/cm ²)	Power Density Limit (mW/cm ²)
908.4 MHz	912 - 924 MHz	779.5 – 784.5 MHz		
0.00003	0.0032	0.1	0.1	0.5

Thus, the EUT meets the uncontrolled exposure limit at 20 cm when all transmitters are transmitting simultaneously.