

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.