August 20, 2019

EMCE Engineering
1726 Ringwood Ave
San Jose, CA USA

RE: Maximum Permissible Exposure

To Whom It May Concern:

The equipment operating in 462.4125MHz and 467.4125MHz passband in this application require a separation distance of at least ***27.3cm and 26.8cm*** respectively**.** This distance must be maintained between the user and antenna when the product is used with a 10dBi antenna.

This was calculated by:

MPE limit according to 47CFR §1.1310

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

The power density can be calculated from the equation below (equation #4 from OET Bulletin 65, 97-01 edition, page 19)

$$S = \frac{P*G}{4 * pi * R^2}$$

S Power Density (mW/cm^2)

P Conducted Power (mW)

R Distande (cm)

G Numerical Antenna Gain

From this equation we can calculate the safety distance needed to fulfil the MPE limits
We have assumed no feeder loss and a high directional antenna with 17dBi antenna gain at the installation.

				G	P	S	S	R
Amplifier	**Freq (MHz)**	**Output power to antenna (dBm)**	**Antenna gain (typical) (dBi)**	**Antenna Gain Numerical**	**TX Power conducted (mW)**	**Power density limit* (mW/cm2)**	**Power density calculated (mW/cm2)**	**Calculated safety distance (cm)**
462.4125	462.4125	24.6	10	10.00	288	0.31	0.57	27.3
467.4125	467.4125	24.5	10	10.00	282	0.31	0.56	26.8

* Limit for General Population/Uncontrolled Exposure

Note: If S calculated is less than S limit then the R distance meets the 20cm and the saftey distance is then 20cm.

Please contact me if there is any other information you may need.

Sincerely,

Amy L Sanvido

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On behalf of Bird Technologies

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