

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-6027/18-02-09 MPE (FCC_IC)

Certification numbers and labeling requirements	
FCC ID	NF3 - FR5CPEC
IC number	3887A - FR5CPEC
HVIN (Hardware Version Identification Number)	Front Radar 5 Car Plus Ethernet CAN
PMN (Product Marketing Name)	FR5CPEC
FVIN (Firmware Version Identification Number)	-/-

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EUT technologies:

Technologies:	Max. power (AVG):	Max. antenna gain:	Min. pathloss:
76 GHz Radar	Measured max. EIRP: 22.8dB*	n/a	-- (if applicable)

)* detailed measurement results in CTC advanced test report 1-6027/18-01-07

Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

where: S = Power density
 P = Power input to the antenna
 G = Antenna gain
 R = Distance to the center of radiation of the antenna
 PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

Frequency Range (MHz)	Power Density (mW/cm ²)	Averaging Time (minutes)
300 - 1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

Prediction: worst case

	Technology	RADAR
	Frequency	76000 MHz
P·G	Measured max. EIRP (avg.)	22.8 dBm
R	Distance	20 cm
S	MPE limit for uncontrolled exposure	1.0000 mW/cm ²
	Calculated Power density:	0.0379 mW/cm ²
	Calculated percentage of limit:	3.79%

This prediction demonstrates the following:

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.

Prediction of MPE limit at given distance - IC

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}W$ (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834} W$ (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Prediction: worst case

		76 GHz
	Technology	RADAR
	Frequency	76000 MHz
P·G	Max. measured EIRP (avg.)	22.8 dBm
R	Distance	20 cm
	Maximum EIRP	190.5 mW
	Exclusion Limit from above:	5.00 W
	Calculated percentage of limit:	3.81%

Conclusion: RF exposure evaluation is not required.

For applications where minimum distance to radiating element is 20cm Annex C of RSS-102 should be filled out.