

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-2497/21-01-08 MPE (FCC_ISED)

Certification numbers and labeling requirements	
FCC ID	NF3-FR5TPCC
ISED number	3887A-FR5TPCC
HVIN (Hardware Version Identification Number)	FR5TPCC
PMN (Product Marketing Name)	Front Radar 5 Truck Plus CAN CAN
FVIN (Firmware Version Identification Number)	-/-
HMN (Host Marketing Name)	-/-

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EUT technologies:

Technologies:	Max. measured average EIRP [dBm]	#
Radar 76.0 to 77.0 GHz	21.31	A

Details and origins of the measurements shown in the table above:

#	Results from:	Additional information
A	1-2497/21-01-03 CTC advanced GmbH	Max. EIRP page 21

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

Technologies:	RADAR	
Frequency (MHz)	76 to 77	GHz
PG max power (EIRP)	21.31	dBm
R Distance	20	cm
S MPE limit for uncontrolled exposure	1	mW/cm ²
Calculated Power density:	0.0269	mW/cm ²
Calculated percentage of Limit:	2.69%	

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 - ISED

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

		RADAR	
	Frequency	76 to 77	GHz
R	Distance	20	cm
PG	Maximum EIRP	21.31	dBm
PG	Maximum EIRP	135.2	mW
	Exclusion Limit from above:	5.00	W
	Calculated percentage of Limit:	2.70%	

Conclusion: RF exposure evaluation is not required.