

Report No:	FR5CPEC_MPE_CP21 (FCC_IC)
Date:	29-Sept-2021
Model:	FR5CPEC
Ref:	CP21



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Germany

Maximum Permissible Exposure (MPE) & Exposure Evaluation

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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)	-/-

Date: 29-September-2021

Place: Leonberg

Robert Binder
Certification Engineer, XC-DA/ESR1

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EUT technologies:

EUT technologies:	Max. power (AVG):	Max. antenna gain:	Min. pathloss:
76 GHz Radar	Measured max. EIRP: 21.14 dBm*	n/a	-- (if applicable)

)* detailed measurement results in IBL-Lab GmbH test reports No.: 21075978-21299-0 (FCC report) and 21075978-21298-0 (RSS Report)

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 taken 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.)	21.14	dBm
R	Distance	20	cm
S	MPE limited for uncontrolled exposure	1.0000	mW/cm ²
	Calculated Power Density:	0.0259	mW/cm ²
	Calculated Percentage of Limit:	2.59	%

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.

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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

	Technology	Radar	
	Frequency	76000	MHz
P*G	Measured max. EIRP (avg.)	21.14	dBm
R	Distance	20	cm
	Maximum EIRP	130.02	mW
	Exclusion Limit from above	5.00	W
	Calculated Percentage of Limit:	2.60	%

Conclusion: RF exposure evaluation is not required.