

## Maximum Permissible Exposure (MPE) & Exposure evaluation

**Report identification number: 1-0764/20-01-16 MPE (FCC\_ISED)**

Certification numbers and labeling requirements	
FCC ID	S9I-MRGEN21
ISED number	5860A-MRGEN21
HVIN (Hardware Version Identification Number)	MRGEN21
PMN (Product Marketing Name)	MRGEN21
FVIN (Firmware Version Identification Number)	-/-
HMN (Host Marketing Name)	-/-

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

### Document authorised:



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**EUT technologies:**

Technologies:	Max measured avg. EIRP: [dBm]
Automotive Radar 76 GHz	25.98

**NOTE:**

Test results taken from CTC advanced GmbH report 1-0764/20-01-02 (page21).

**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 <sup>2</sup> )	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

**Prediction: worst case**

Technologies:	Radar	
Frequency (MHz)	76000	
PG Declared max power (EIRP)	25.98	dBm
R Distance	20	cm
S MPE limit for uncontrolled exposure	1	mW/cm <sup>2</sup>
<b>Calculated Power density:</b>	0.0789	mW/cm <sup>2</sup>
<b>Calculated percentage of Limit:</b>	7.89%	

**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

		0.3 - 6 GHz	
	Frequency	76000	MHz
R	Distance	20	cm
P	Max power input to the antenna	25.98	dBm
G	Antenna gain	0	dBi
PG	Maximum EIRP	25.98	dBm
PG	<b>Maximum EIRP</b>	396.3	mW
	<b>Exclusion Limit from above:</b>	5.00	W
	<b>Calculated percentage of Limit:</b>	7.93%	

**Conclusion:** RF exposure evaluation is not required.