

Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-9898-25-05-03_TR1-R02 MPE (FCC_I SED)

Certification numbers and labeling requirements	
ISED number	8821A-DR30NM30E
FCC ID	YQ7-DR30NM30E
HVIN (Hardware Version Identification Number)	7534/1
PMN (Product Marketing Name)	DR30N-M30E
Applicant:	Hans Turck GmbH & Co. KG
Manufacturer:	Werner Turck GmbH & Co. KG
Product:	DR30N-M30E-IOL8X2-H1141
Kind of test item:	Radar Displacement Sensor

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:

Alexander Hnatovskiy
Lab Manager
Radio Labs

Eric Tüttmann
Testing Manager
Radio Labs

EUT technologies:

Technologies:	Max. power [dBm]		Antenna gain max.: [dBi]	#
	conducted	Avrg. EIRP		
122 to 123 GHz Radar	--	8.15	--	A,B

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

#	Results from:	Additional information
A	1-9898-25-01-02_TR1-R01 cetecom advanced GmbH	Measurement results page 32 Far field conditions pg.24
B	1-9898-25-03-02_TR1-R02 cetecom advanced GmbH	Measurement results page 32 Far field conditions pg.24

Minimum safety distance declared by manufacturer: 20cm

Prediction of MPE limit at given distance - FCC

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

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 (EIRP)

The table below is excerpted from Table 1 - Limits for Maximum Permissible Exposure (MPE) - "General Population/Uncontrolled Exposure" according according FCC 19-126A1

Frequency Range (MHz)	Power Density (mW/cm ²)	Averaging Time (minutes)
1500 – 3 000 000	1.0	30

where f = Frequency (MHz)

Prediction: worst case

	Technology	RADAR	
	Frequency	122000	MHz
P·G	Meas. EIRP	8.15	dBm
R	Distance	20	cm
S	MPE limit for uncontrolled exposure	1.0	mW/cm ²
	Calculated Power density:	0.0013	mW/cm ²
	Calculated percentage of limit:	0.13%	

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 6, chapter 6 Reference levels for general public (uncontrolled environment):

According to: RSS 102-ISSUE 06				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.3417}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 / f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000 / f^{1.2}$

Note: f is frequency in MHz.

Prediction: worst case

	Technology	RADAR	
	Frequency	122000	MHz
P·G	Meas. EIRP	8.15	dBm
R	Distance	20	cm
S	MPE limit for uncontrolled exposure	10.00	W/m ²
	Calculated Power density:	0.013	W/m ²
	Calculated percentage of limit:	0.13%	

Conclusion: RF exposure evaluation is not required.