

MAXIMUM PERMISSIBLE EXPOSURE EVALUATION REPORT

Applicant: Changsha Microbrain Intelligent Technology Co., Ltd.

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No.56, Yuelu District, Changsha, China

Product Name: Vehicle detection radar sensor

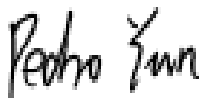
FCC ID: 2AV20-ITS-AXX-XX

Standard(s): 47 CFR §1.1310, 47 CFR §2.1091, 47 CFR §15.255(g)

Report Number: 2402V64080E-RF-00D

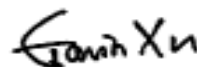
Report Date: 2024/12/4

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).



Reviewed By: Pedro Yun

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GENERAL INFORMATION

General Description Of Equipment under Test

EUT Name:	Vehicle detection radar sensor
EUT Model:	ITS-AX3-4
Multiple Models:	ITS-AXX-XX
Rated Input Voltage:	DC 9-24V (Typical DC 12V)
Serial Number:	2O5W-1
EUT Received Date:	2024/7/9
EUT Received Status:	Good
Note: The multiple models are electrically identical with the test model. The difference is only the enclosure. Please refer to the declaration letter for more detail, which was provided by manufacturer.	

Radio Parameters ▲

Radio	Frequency (MHz)	Conducted output power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	EIRP including Tune-up Tolerance (dBm)
BLE	2402-2480	-2.0	1.83	-0.17
Radar	60000-64000	-6.0	12.0	6.0

RF EXPOSURE EVALUATION (MPE)

RF Exposure Evaluation

Applicable Standard

According to subpart 15.247(i), 15.255(g) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Operation Modes	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	1.83	1.52	-2	0.63	20.00	0.0002	1.0
Radar	60000-64000	12	15.85	-6	0.25	20.00	0.0008	1.0

Simultaneous transmission:

BLE and Radar can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

$$= S_{BLE} / S_{limit-BLE} + S_{Radar} / S_{limit-Radar}$$

$$= 0.0002 / 1.0 + 0.0008 / 1.0$$

$$= 0.001$$

$$< 1.0$$

Result: Compliant. The device compliant RF Exposure at 20cm distances.

EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the attachment 2402V64080E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and 2402V64080E-RF-INP EUT INTERNAL PHOTOGRAPHS.

******* END OF REPORT *******