849 NW STATE ROAD 45
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TIMCO ENGINEERING, Inc.

An IIA Company

RF Exposure Evaluation Report

APPLICANT	CATTRON NORTH AMERICA INC.
ADDRESS	655 N. RIVER ROAD NW SUITE A WARREN, OH 44483-2254 USA
FCC ID	CN290273
IC	1007A-90273
MODEL NUMBER	90273 TRX
PRODUCT DESCRIPTION	IR LRM2 450/2400 MHz MODULE
FINAL TEST DATE	6/8/2020
PREPARED BY	Tim Royer
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Report Version	Description	Issue Date
1702-20 MPETestReport_	Rev1	Initial Issue	6/8/2020

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GENERAL REMARKS

Summary

The device under test does:

☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.

☐ Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669
Designation #: US1070

Prepared by:

Name and Title	Tim Royer, Project Manager / EMC Engineer
Date	5/26/2020

GENERAL INFORMATION

EUT Description	IR LRM2 450/2400 MHz MODULE		
Model Number	90273 TRX		
EUT Power Source	☒110–120Vac, 50–60Hz	☒ DC Power (3.3 VDC)	☐ Battery Operated
Test Item	☐ Engineering Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☒ Fixed	☐ Mobile	☐ Portable
Antenna Connector	Internal		
Test Conditions	The temperature was 26ºC Relative humidity of 50%.		
Modification to the EUT	No Modification to EUT.		
Applicable Standards	FCC CFR 47 Part 2.1091		
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070		

ANTENNA INFORMATION

Antenna is Provided	Type	Max Gain (dBi)
No	n/a	**0.0**

RF POWER OUTPUT

Tuned Frequency MHz	RF Power (High) dBm	W
450	18.64	0.073
460	18.55	0.071
470	18.26	0.069

Tune up tolerance

During the calibration, the radio will be calibrated between 450.00 -470.00MHz, Maximum TX power is +19.00+/-1.0dBm with 4GSFK modulation.

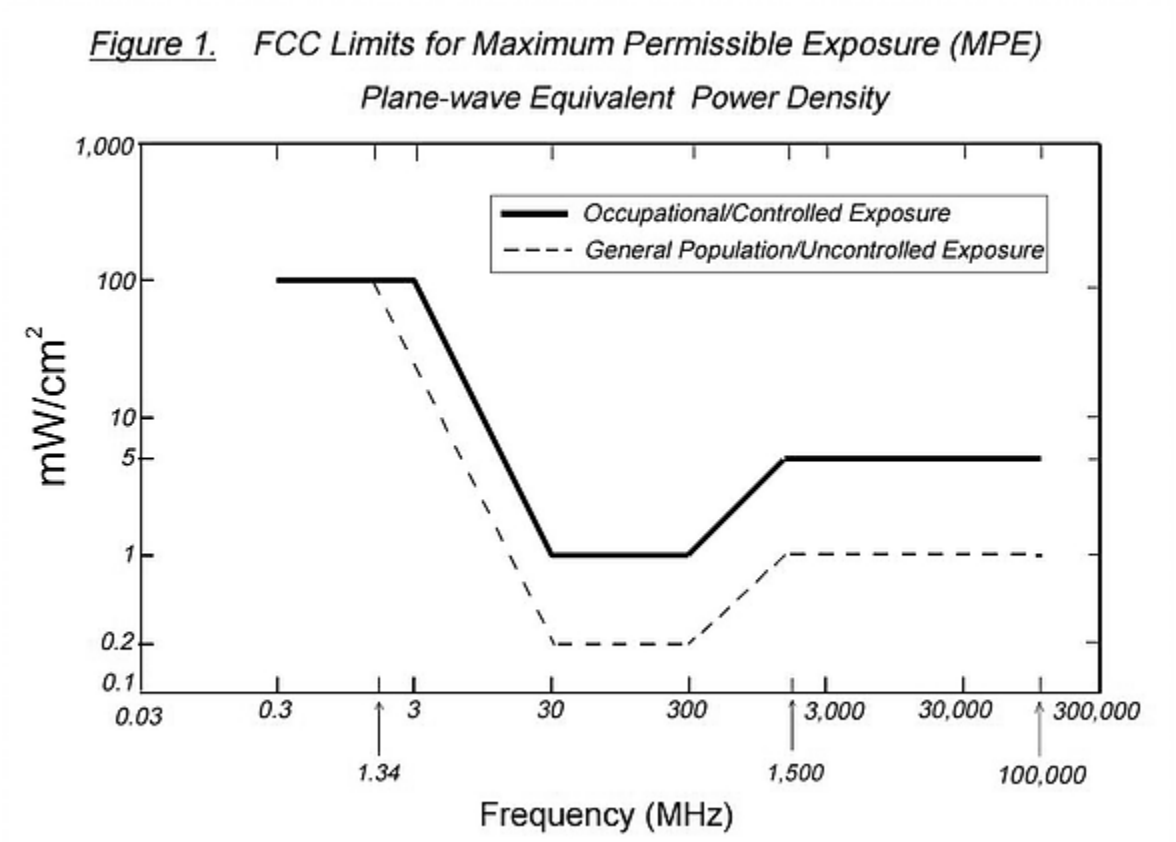
The BT module will be tested at 2.402-2.448GHz with maximum TX power 15+/-1.0 dBm with Code8 modulation.

MPE CALCULATION

The minimum separation distance is calculated as follows:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

MPE LIMITS

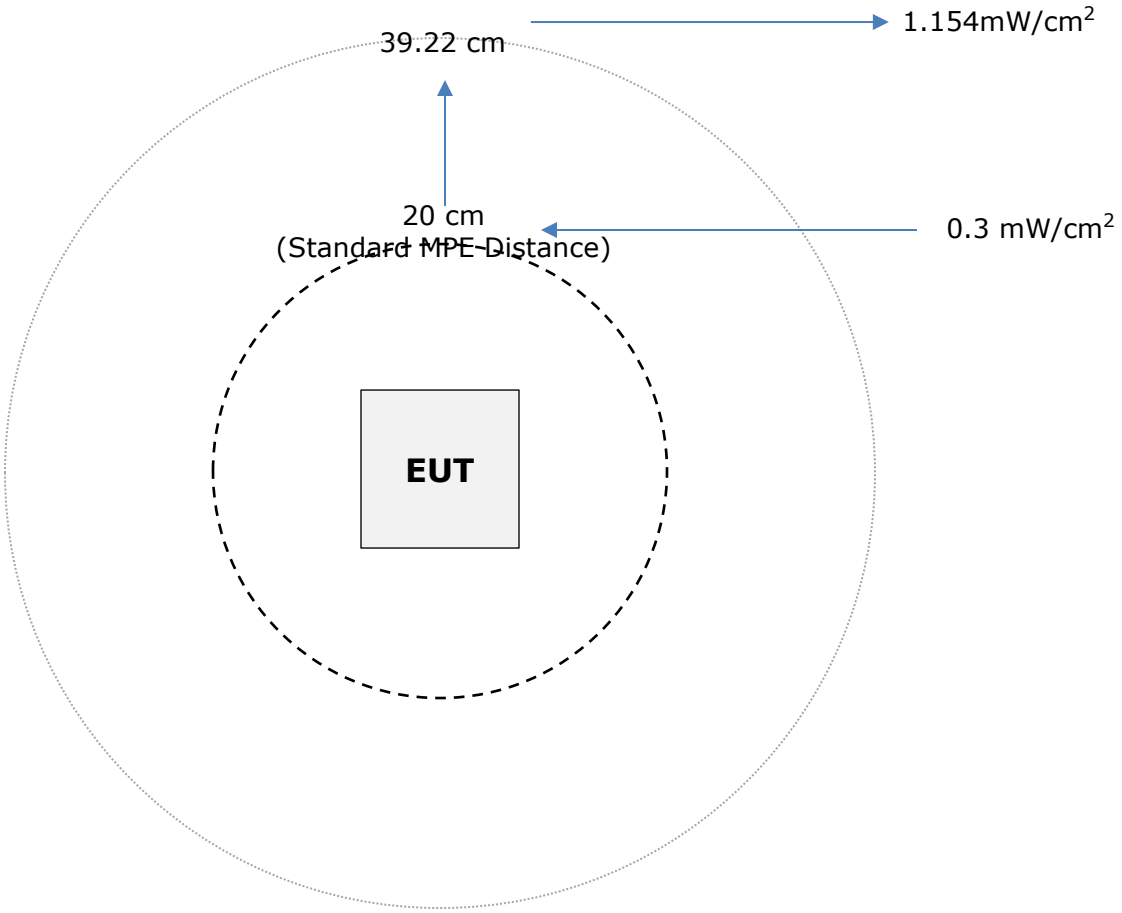


MPE Table

General Uncontrolled Exposure

The limit for General Uncontrolled Exposure Environment is calculated as shown in FCC Pt. 1.1310, Table B:

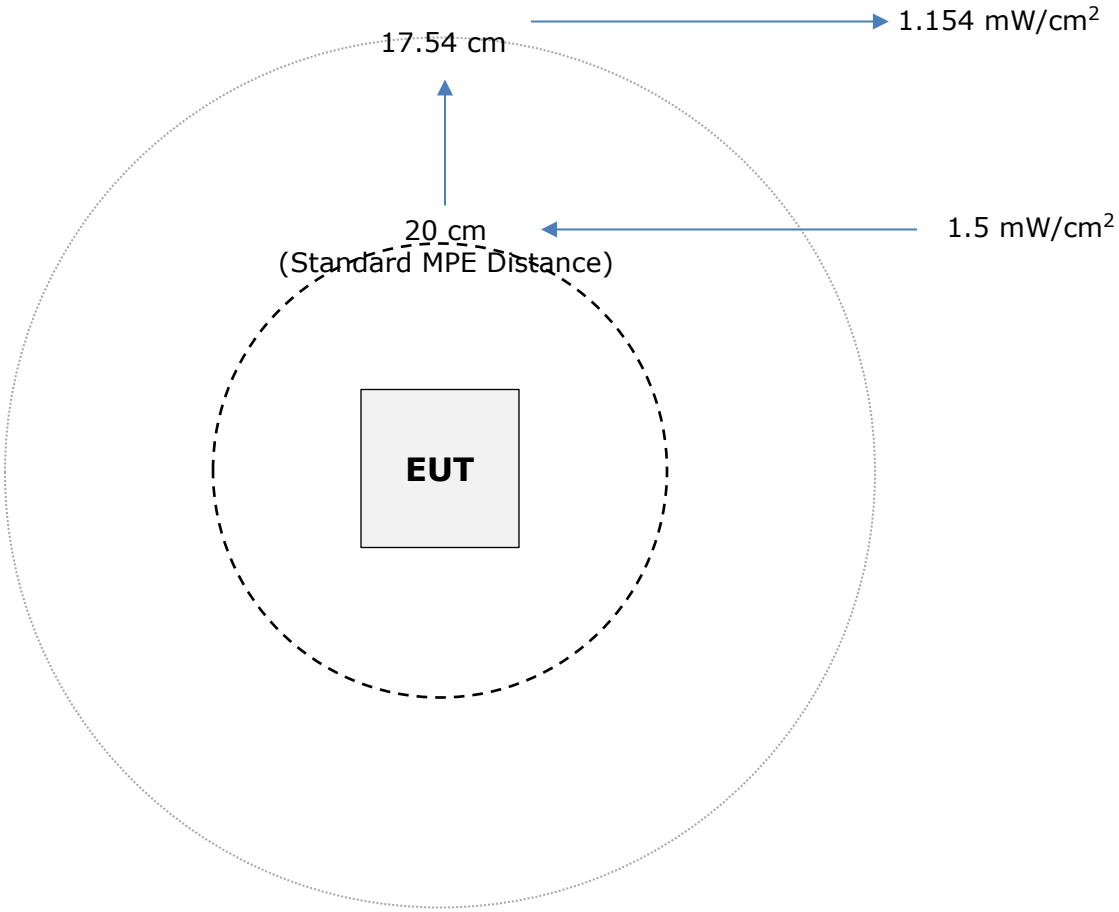
Variable	Value
Max Power	5.8 W
Frequency Range	450-470 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dBi
Coax Loss	0 dB
Power Density	0.3 mW/cm^2
Minimum Separation Distance	39.22 cm



General Controlled Exposure

The limit for General Controlled Exposure Environment is calculated as shown in FCC Pt. 1.1310, Table A:

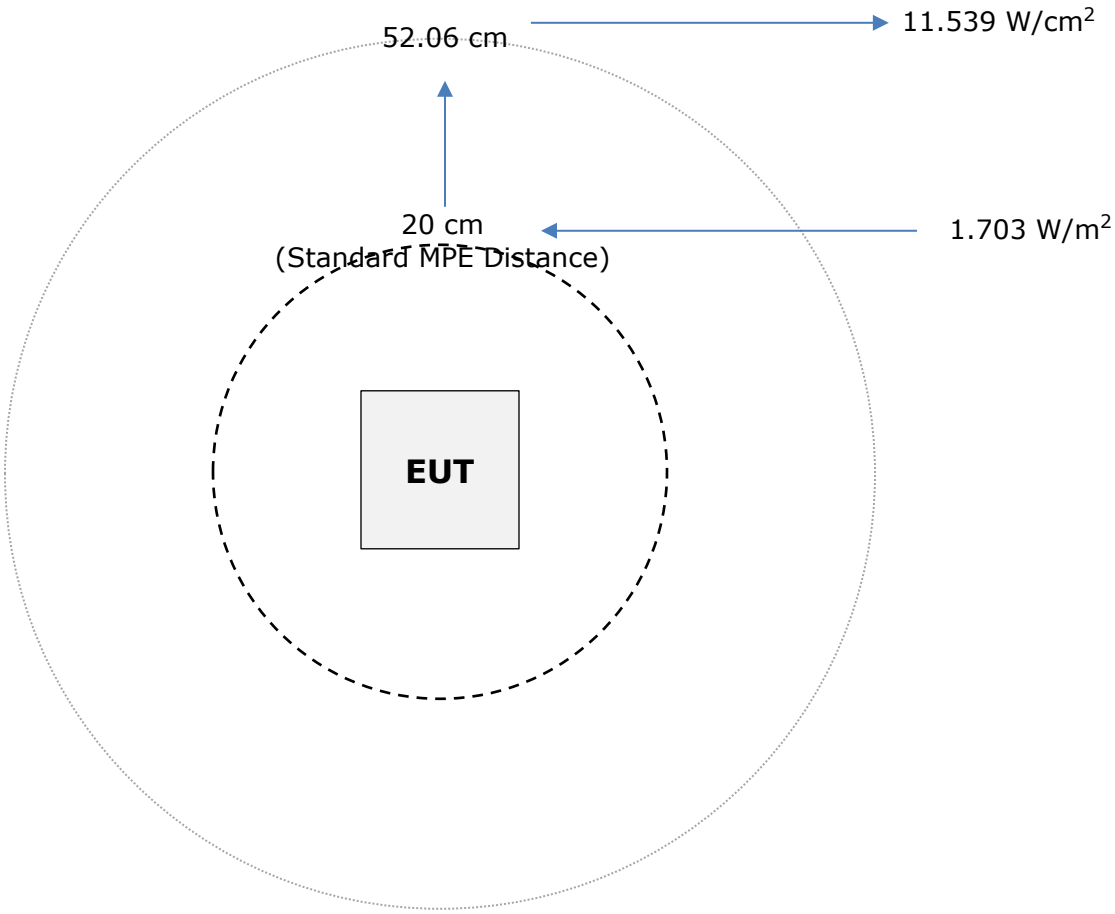
Variable	Value
Max Power	5.8 W
Frequency Range	450-470 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dBi
Coax Loss	0 dB
Power Density	1.5 mW/cm^2
Minimum Separation Distance	17.54 cm



IC MPE Calculation:

General <u>Uncontrolled</u> Exposure Environment: The limit for general uncontrolled exposure environment is shown in RSS-102, Issue 5, Table 4.

Variable	Value
Max Power	5.8 W
Frequency Range	450-470 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dBi
Coax Loss	0 dB
Power Density	1.703 W/m^2
Minimum Separation Distance	52.06cm



General <u>Controlled</u> Exposure Environment: The limit for controlled exposure environment is shown in RSS-102, Issue 5, Table 6.

Variable	Value
Max Power	5.8 W
Frequency Range	450-470 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dBi
Coax Loss	0 dB
Power Density	13.636 W/m^2
Minimum Separation Distance	12.08 cm