



849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA
PH: 888.472.2424 OR 352.472.5500
FAX: 352.472.2030
EMAIL: INFO@TIMCOENGR.COM
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

RF Exposure Evaluation Report

APPLICANT	CATTRON-THEIMEG INCORPORATED
	58 W. SHENANGO STREET SHARPSVILLE PA 16150-1198 USA
FCC ID	CN279543-91072
MODEL NUMBER	79543+91072 TRX
PRODUCT DESCRIPTION	450 MHz RF MODULE
STANDARD APPLIED	CFR 47 Part 2.1091
PREPARED BY	Sid Sanders

We, TIMCO ENGINEERING, INC. would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and meets the requirements.

The attached report shall not be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

GENERAL REMARKS

Attestations

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

I attest that the necessary evaluations were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669

Authorized Signatory Name:


A handwritten signature in black ink, appearing to read "Sanders", is overlaid on a circular blue ink stamp. The stamp contains the text "TIMCO ENGINEERING, INC." around the perimeter and "FLA" in the center.

Sid Sanders

Engineering Project Manager

Date: 11/6/2014

GENERAL INFORMATION

EUT Description	450 MHz RF MODULE
FCC ID	CN279543-91072
Model Number	79543+91072 TRX
Frequency Range	450-470MHz
Type of Emission	7K60F1D, 7K60F1E 7K60F1W, 7K60FXE, 7K60FXD
Modulation	PRBS-9, 3FSK
EUT Power Source	<input checked="" type="checkbox"/> 110–120Vac/50– 60Hz
	<input type="checkbox"/> DC Power 12V
	<input type="checkbox"/> Battery Operated Exclusively
Test Item	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
Type of Equipment	<input type="checkbox"/> Fixed
	<input checked="" type="checkbox"/> Mobile
	<input type="checkbox"/> Portable
Test Conditions	The temperature was 24-26°C with a relative humidity of 50-64%.
Revision History to the EUT	None
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

Applicant: CATTRON-THEIMEG INCORPORATED

FCC ID: CN279543-91072

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RF Exposure Requirements

General information

Device type: RF Module

Devices that operate under Part 90 of this chapter are subject to RF exposure evaluation prior to equipment authorization or use.

Antenna

Splash patch antenna -10 dBi,
 $\frac{1}{4}$ Wave Whip Antenna, 0 dBi
 $\frac{1}{2}$ Wave Dipole PCB antenna, 2.15 dBi

Operating configuration and exposure conditions:

The conducted output power is shown in the table below. Typical use qualifies for a maximum duty cycle factor of 100%.

Operation: A typical installation consists of an antenna TO Hand separation of at least 152mm.

Nom. Attenuation for RG 213/U:

Frequency MHz	Attenuation per 100ft. dB
1	.27
10	.55
50	1.3
100	1.9
200	2.7
400	4.1
700	6.5
900	7.6
1000	8.0
4000	21.5

MPE Calculation:

The minimum separation distance is calculated as follows:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

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The limit for general uncontrolled exposure environment is shown in FCC rule Part 1.11310, Table 1.

Minimum Separation Distance for Mobile or Fixed Devices
General Population/Uncontrolled Exposure

Insert values in yellow highlighted boxes to determine Minimum Separation Distance

Max Power	2	W	equals	Max Power	2000	mW
Duty Cycle	100	%	equals	Duty Factor	0.5	numeric
Antenna Gain	2.15	dBi	equals	Gain numeric	1.64059	numeric
Coax Loss	0	dB		Gain - Coax Loss	1.64059	numeric
Power Density	0.32	mW/cm ²				

Enter power Density from the chart to the right

Frequency **470** MHz

Rule Part 1.1310, Table 1

Frequency rang	Power den	Enter this value
MHz	mW/cm ²	mW/cm ²
0.3-1.34	100	100
1.34-30	180/f ²	0.0
30-300	0.2	0.2
300-1,500	f/1500	0.3
1,500-100,000	1	1

f = frequency in MHz

Minimum Separation Distance **20 cm** **0.20 m**

Minimum Separation in Inches

7.87402 Inches

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