



F2 Labs
16740 Peters Road
Middlefield, Ohio 44062
United States of America
www.f2labs.com

MPE REPORT

Manufacturer: Marjamaa Engineering Inc.
395 County Road
Mount, Minnesota 55364 USA

Applicant: TAPCO (Traffic and Parking Control Co., Inc.)
5100 West Brown Deer Road
Milwaukee, Wisconsin 53223 USA

Product Name: Radio 154450

Product Description: 25dBm 900 MHz Radio

**Operating Voltage/Freq.
of EUT During Testing:** 3.7V from lab supply. EUT is battery only in use.

Model: 154450

FCC ID: 2ANWN-RM154450

IC: 25608-RM154450

Testing Commenced: 2024-11-01

Testing Ended: 2024-12-19

Test Results: **In Compliance**

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- KDB447498
- FCC 1.1310
- Safety Code 6
- RSS-102, Issue 6
- IEEE C95.3



Order No(s): F2P33484

Applicant: TAPCO (Traffic and Parking Control Co., Inc.)
Model: 154450

Evaluation Conducted by:

Julius Chiller, Senior Wireless Project Engineer

Report Reviewed by:

Ken Littell, Vice President of Operations

F2 Labs
26501 Ridge Road
Damascus, MD 20872
Ph 301.253.4500

F2 Labs
16740 Peters Road
Middlefield, OH 44062
Ph 440.632.5541

F2 Labs
8583 Zionsville Road
Indianapolis, IN 46268
Ph 317.610.0611

This test report may be reproduced in full; partial reproduction only may be made with the written consent of F2 Labs. The results in this report apply only to the equipment tested.



TABLE OF CONTENTS

1	<u>ADMINISTRATIVE INFORMATION</u>
2	<u>SUMMARY OF TEST RESULTS/MODIFICATIONS</u>
3	<u>ENGINEERING STATEMENT</u>
4	<u>EUT INFORMATION AND DATA</u>
5	<u>RF EXPOSURE FOR DEVICE >20cm FROM HUMAN</u>
	➤ <u>FCC</u>
	➤ <u>IC</u>



1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio.

Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

Site description and attenuation data are on file with the Certification and Engineering Bureau, Industry Canada, Site Number 4730B.

1.2 Measurement Procedure:

All measurements were performed according to:

- KDB558074
- FCC 15.247
- RSS-247
- RSS-102
- IEEE C95.3

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P33484-03E	First Issue	2025-02-07	K. Littell

**2 SUMMARY OF TEST RESULTS**

Test Name	Standard(s)	Results
RF Exposure for Device >20cm from Human	KDB447498 FCC 1.1310 Safety Code 6 RSS-102 IEEE C95.3	Complies

Modifications Made to the Equipment
None



3 ENGINEERING STATEMENT

This report has been prepared on behalf of TAPCO (Traffic and Parking Control Co., Inc.) to provide documentation for the calculations and testing described herein, based on the measurements taken in supporting Test Reports. This equipment has been tested, and calculations were found to comply with KDB447498, FCC 1.1310, Safety Code 6 and RSS-102. The test results found in this test report relate only to the item(s) tested.



4 EUT INFORMATION AND DATA

4.1 Equipment Under Test:

Product: 900 MHz Radio

Model(s): 154450

Serial No.: R2_Dev3

FCC ID: 2ANWN-RM154450

IC: 25608-RM154450

4.2 Trade Name:

TAPCO (Traffic and Parking Control Co., Inc.)

4.3 Power Supply:

3.7V Battery

4.4 Applicable Rules:

- KDB447498
- FCC 1.1310
- Safety Code 6
- RSS-102
- IEEE C95.3

4.5 Equipment Category:

Radio Transmitter-DTS

Radio Transmitter-FHSS

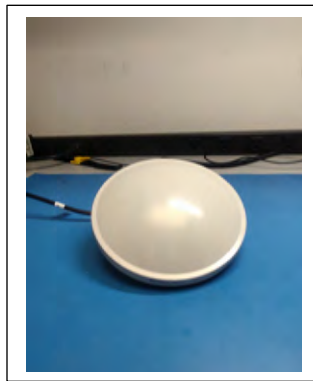
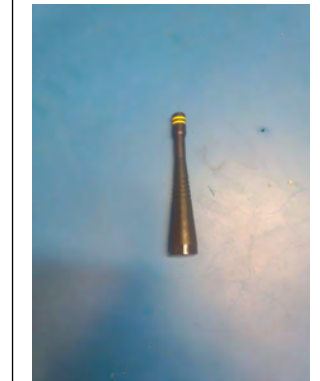
4.6 Antenna:

See Below



4.7 Accessories:

Device	Manufacturer	Type	Model	Gain (dBi)	Serial Number
Antenna	Linx Technology	Monopole	ANT-916-CW-QW	1.8	None Specified
Antenna	Laird	Yagi	PC906	10.65	None Specified
Antenna	PCTel	Monopole	MFB9153	5.15	None Specified
Antenna	Pulse Larsen	Dipole	W1063	1.2	None Specified
Antenna	WP Wireless	Puck	WPANT30026-S5A	4	None Specified

PCTEL MONOPOLE**YAGI****DIPOLE****PUCK****LINX MONOPOLE**

4.8 Test Item Condition:

The equipment to be tested was received in good condition.



5. RF EXPOSURE FOR DEVICE >20cm FROM HUMAN

5.1 Requirements: Distance used is 20cm

The following measurement results apply only to the EUT while using the 10.65dBi Yagi antenna. All other antennas are covered by the MPE calculations on the next page.

An Isotropic Field Probe was set up 20cm from the antenna of the EUT in 4 different positions. The Field Probe and antenna were rotated to find the maximum orientation and position.



Formula used for conversion from V/m to Power in mW/cm² was $P = V^2 / Z$

	X (V/m)	X (mW/cm ²)	X (W/m ²)	Y (V/m)	Y (mW/cm ²)	Y (W/m ²)	Z (V/m)	Z (mW/cm ²)	Z (W/m ²)
Left	5.23	0.007	0.07	6.69	0.018	0.18	6.37	0.011	0.11
Right	6.37	0.011	0.11	5.75	0.008	0.08	7.02	0.013	0.13
Front	10.82	0.031	0.31	9.52	0.024	0.24	10.50	0.029	0.29
Top	6.02	0.009	0.09	8.40	0.019	0.19	8.29	0.018	0.18

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shield Room	0175	Ray Proof	N/A	11645	2025-02-14
Isotropic Field Probe	CL220	ETS	HI-6006	00215989	2026-04-04
Temp/Hum Rec	CL297	Extech	445703	0721	2027-10-08
Software:	Tile Version 3.4.B.3 Software Verified:: 2025-02-14 to 2025-02-14				

**Requirements: Distance used is 20cm**

Note: The following results are the worst case of all remaining antennas, besides the Yagi 10.65dBi antenna that was covered by the assessment on the previous page.

FCC	
Limit:	0.610 mW/cm ²
Formula used for result:	<u>E.I.R.P.</u> $4 \pi R^2$ (where R is distance)
Results:	Highest Conducted Output Power was on the 915 MHz Mid Channel. 334.2mW/25.24dBm. E.I.R.P. = 1094mW $\frac{1094\text{mW}}{4 \pi R^2} = \frac{1094\text{mW}}{5026.55} = 0.218\text{mW/cm}^2$

IC	
Limit:	2.77W/m ²
Formula used for result:	<u>E.I.R.P.</u> $4 \pi R^2$ (where R is distance)
Results:	Highest Conducted Output Power was on the 915 MHz Mid Channel. 334.2mW/25.24dBm. E.I.R.P. = 1094mW $\frac{1094\text{mW}}{4 \pi R^2} = \frac{1094\text{mW}}{5026.55} = 2.18\text{W/m}^2$