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RF Exposure Evaluation Report

APPLICANT	EF JOHNSON COMPANY
	123 N State Street Waseca Minnesota 56093
FCC ID	ATH2425M70
MODEL NUMBER	242-5M70
PRODUCT DESCRIPTION	VIKING MOBILE 700/800 MHZ RADIO
STANDARD APPLIED	CFR 47 Part 2.1091
PREPARED BY	Nam Nguyen

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

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:

Nam Nguyen
Engineering Project Manager

Date: May 13, 2014

GENERAL INFORMATION

EUT Description	VIKING MOBILE 700/800 MHZ RADIO
FCC ID	ATH2425M70
Model Number	242-5M70
Frequency Range	**763 to 805** MHz (25W) **806 to 869** MHz (35W)
Type of Emission	**763 to 805 MHz**: 11K0F3E, 8K10F1E, 8K10F1D, 8K10F7E **806 to 869 MHz**: 16K0F3E, 14K0F3E, 8K10F1E, 8K10F1D, 8K10F7E
Modulation	FM, C4FM, H-CPM
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power 12V
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Test Conditions	The temperature was 26ºC with a relative humidity of 50%.
Revision History to the EUT	None
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

RF Exposure Requirements

General information

Device type: Part 90 transceiver of a mobile push to talk radio type.
Device category: Mobile
Environment: Uncontrolled Exposure

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

Antenna

The manufacturer does specify these antennas:

PCTEL Z2165S 3 dBi
MAXRAD MAX7603S 3 dBi

Configuration	Antenna p/n	Type	Max. Gain (dBi)
mobile mounted	Any	omni	3.0

Operating configuration and exposure conditions:

The conducted output power is 35 Watts. Typical use qualifies for a maximum duty cycle factor of 100%.

- Mobile operation: A typical installation consists of an antenna system with a coaxial cable of the type RG 213/ U type which has a loss of 1 dB for a length of 30 feet at UHF frequencies.

MPE Calculation:

The minimum separation distance is calculated as follows:

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

The limit for general population/uncontrolled exposure environment below 869 MHz is 0.5 mW/cm^2 .

Frequency: 763-869 MHz
The conducted power output is 35 watt.
100% talk time in 30 minutes

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	35	W	*equals*	Max Power	35000	mW
Duty Cycle	100	%	*equals*	Duty Factor	1	numeric
Antenna Gain	3	dBi	*equals*	Gain numeric	1.995262	numeric
Coax Loss	1	dB		Gain - Coax Lo	1.584893	numeric
Power Density	0.5	mW/cm^2				

Enter power Density from the chart to the right

Frequency	763	MHz

Rule Part 1.1310, Table 1

Frequency ran	Power de	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	**0.5**
1,500-100,000	1	**1**

f = frequency in MHz

Minimum Separation Distance	**94 cm**	**0.94 m**

36.96396 Inches