849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA

PHONE: 888.472.2424 OR 352.472.5500
EMAIL: INFO@TIMCOENGR.COM
WEB: HTTP://WWW.TIMCOENGR.COM

TIMCO ENGINEERING, Inc.

An IIA Company

FCC CFR 47 Part 90 C2PC Test Report

APPLICANT	KP ELECTRONIC SYSTEMS LTD.
ADDRESS	P.O. BOX 42 TEFEN INDUSTRIAL PARK, 24959 ISRAEL
FCC ID	H78KPMT2W
MODEL NUMBER	MT2WM
PRODUCT DESCRIPTION	VHF AUTOMATIC METER READING TRANSCEIVER W 2.4 GHz TX
DATE SAMPLE RECEIVED	08/24/2019
FINAL TEST DATE	08/24/2019
TESTED BY	Tim Royer
APPROVED BY	Franklin Rose
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Report Version	Description	Issue Date
2200AUT19 PT90_TestReport_	Rev1	Initial Report	08/24/2019
	Rev	Revised Test frequencies	09/27/2019

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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

Tested b

Sr. EMC Engineer
EMC-003838-NE

Name and Title	Tim Royer, Project Manager/Testing Engineer
Date	09/10/2019

Reviewed and Approved by:

Name and Title	Franklin Rose, Project Manager / EMC Testing Technician
Date	09/13/2019

GENERAL INFORMATION

EUT Description	VHF AUTOMATIC METER READING TRANSCEIVER W 2.4 GHz TX
FCC ID	H78KPMT2W
Model Number	MTW2M
Operating Frequency	151.0-156.0 MHz, 172.5-173.5 MHz
Test Frequencies	151, 172.5 MHz
Type of Emission	2K46F1D (Narrowband Digital FM)
Modulation	FM
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power (6.5 V)
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ Portable
Antenna Connector	BNC
Test Conditions	The temperature was 26ºC Relative humidity of 50%.
Modification to the EUT	No Modification to EUT.
Test Exercise	The EUT was placed in continuous transmit and was operated in “Test Mode” for digital emissions tests.
Applicable Standards	ANSI/TIA 603-E:2016, ANSI C63.26 (2015), FCC CFR 47 Part 2, Part 90
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070

RESULTS SUMMARY

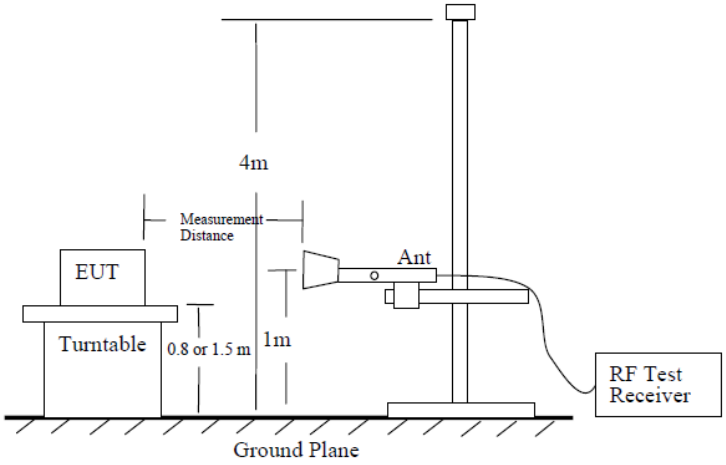
Rule Part No.	Test Item	Results
2.1053(a), 90.210(d)(3)	Field Strength of Spurious Emissions	**PASS**

FIELD STRENGTH OF SPURIOUS EMISSIONS

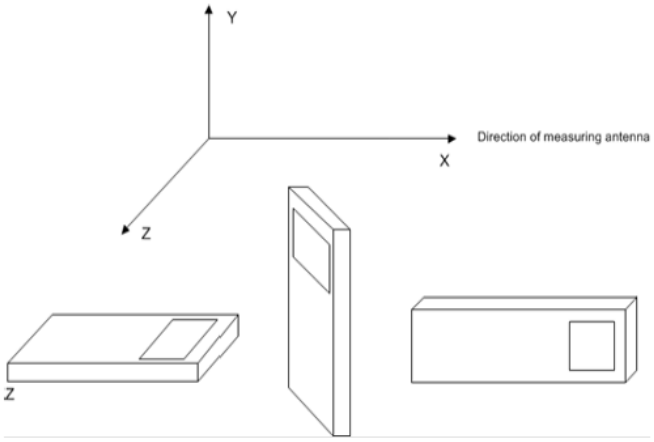
FCC Rule Parts: FCC Part 2.1053(a), 90.210(d)(3)

Method of Measurement: ANSI C63.26, 5.5.4

Test Site Setup:



EUT Orientation(s):



Note: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from the lowest frequency generated internally to at least the tenth harmonic of the fundamental. This test was conducted in accordance with the standard listed above using the substitution method. Measurements were made at the test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669. The measurements below represent the worst case of all the frequencies tested.

Note: The six (6) highest emissions or more of each worst-case operational modes of the EUT are represented below. Emissions 20 dB below the limit are not required to be reported.

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 151 MHz

Power Output		Limit	
dBm	Watts	dBc	dBm
32.09	1.62	52.09	-20.00

Tuned Frequency (MHz)	Emission Frequency (MHz)	Meter Reading (dBµV)	Antenna Polarity	Coax Loss (dB)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Distance (m)	Field Strength (dBµV/m)	ERP (dBm)	Margin (dB)
151.00	302.00	31.06	H	2.08	13.80	46.94	3.000	46.940	**-50.437**	30.44
151.00	302.00	30.72	V	2.08	13.80	46.60	3.000	46.600	**-50.777**	30.78
151.00	302.00	29.30	V	2.08	13.80	45.18	3.000	45.180	**-52.197**	32.20
151.00	302.00	28.33	H	2.08	13.80	44.21	3.000	44.210	**-53.167**	33.17
151.00	453.00	13.63	H	2.47	15.82	31.92	3.000	31.919	**-65.458**	45.46
151.00	453.00	11.92	V	2.47	15.82	30.21	3.000	30.209	**-67.168**	47.17
151.00	604.00	15.64	V	2.87	18.48	36.99	3.000	36.992	**-60.385**	40.39
151.00	604.00	16.10	H	2.87	18.48	37.45	3.000	37.452	**-59.925**	39.93
151.00	755.00	16.84	H	3.23	21.00	41.07	3.000	41.065	**-56.312**	36.31
151.00	755.00	17.23	V	3.23	21.00	41.46	3.000	41.455	**-55.922**	35.92
151.00	906.00	15.45	V	3.55	22.28	41.28	3.000	41.276	**-56.101**	36.10
151.00	906.00	12.44	H	3.55	22.28	38.27	3.000	38.266	**-59.111**	39.11
151.00	1057.00	12.10	H	3.78	26.81	42.69	3.000	42.688	**-54.690**	34.69
151.00	1057.00	10.78	V	3.78	26.81	41.37	3.000	41.368	**-56.010**	36.01
151.00	1208.00	11.34	V	3.96	28.11	43.41	3.000	43.406	**-53.971**	33.97
151.00	1208.00	11.95	H	3.96	28.11	44.02	3.000	44.016	**-53.361**	33.36
151.00	1359.00	11.00	H	4.26	28.70	43.96	3.000	43.962	**-53.416**	33.42
151.00	1359.00	12.29	V	4.26	28.70	45.25	3.000	45.252	**-52.126**	32.13
151.00	1510.00	11.33	V	4.51	27.76	43.60	3.000	43.597	**-53.780**	33.78
151.00	1510.00	11.14	H	4.51	27.76	43.41	3.000	43.407	**-53.970**	33.97

Result: Meets Requirement

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 172.5 MHz

Power Output		Limit	
dBm	Watts	dBc	dBm
32.09	1.62	52.09	-20.00

Tuned Frequency (MHz)	Emission Frequency (MHz)	Meter Reading (dBµV)	Antenna Polarity	Coax Loss (dB)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Distance (m)	Field Strength (dBµV/m)	ERP (dBm)	Margin (dB)
172.50	345.00	42.36	H	2.12	13.70	58.17	3.000	58.175	**-39.202**	19.20
172.50	345.00	33.11	V	2.12	13.70	48.92	3.000	48.925	**-48.452**	28.45
172.50	517.50	22.27	V	2.72	17.45	42.44	3.000	42.438	**-54.940**	34.94
172.50	517.50	27.44	H	2.72	17.45	47.61	3.000	47.608	**-49.770**	29.77
172.50	690.00	19.67	H	3.07	20.40	43.14	3.000	43.138	**-54.239**	34.24
172.50	690.00	23.09	V	3.07	20.40	46.56	3.000	46.560	**-50.817**	30.82
172.50	862.50	32.82	V	3.50	22.30	58.62	3.000	58.618	**-38.760**	18.76
172.50	862.50	30.89	H	3.50	22.30	56.69	3.000	56.688	**-40.690**	20.69
172.50	1035.00	23.91	H	3.75	26.86	54.52	3.000	54.518	**-42.860**	22.86
172.50	1035.00	20.00	H	3.75	26.86	50.61	3.000	50.608	**-46.770**	26.77
172.50	1207.50	16.15	H	3.96	28.10	48.21	3.000	48.206	**-49.171**	29.17
172.50	1207.50	11.95	H	3.96	28.10	44.01	3.000	44.006	**-53.371**	33.37
172.50	1380.00	11.05	H	4.31	28.58	43.94	3.000	43.938	**-53.440**	33.44
172.50	1380.00	12.94	V	4.31	28.58	45.83	3.000	45.828	**-51.550**	31.55
172.50	1552.50	13.90	V	4.58	27.77	46.25	3.000	46.248	**-51.129**	31.13
172.50	1552.50	12.85	H	4.58	27.77	45.20	3.000	45.198	**-52.179**	32.18
172.50	1725.00	12.16	H	4.81	29.40	46.37	3.000	46.372	**-51.005**	31.01
172.50	1725.00	14.20	V	4.81	29.40	48.41	3.000	48.412	**-48.965**	28.97

Result: Meets Requirement

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16–4 or ENTR 100-028 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: "Uncertainty in EMC Measurements" and is documented in the Timco Engineering, Inc. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Timco Engineering, Inc. is reported:

Test Items	Measurement Uncertainty	Notes
RF Frequency Accuracy	± 49.5 Hz	(1)
RF Conducted Power	±0.93dB	(1)
Conducted spurious emission of transmitter valid up to 40GHz	±1.86dB	
Occupied Bandwidth	±2.65%	
Audio Frequency Response	±1.86dB	
Modulation limiting	±1.88%	
Radiated RF Power	±1.4dB	
Maximum frequency deviation: Within 300 Hz and 6kHz of audio freq. Within 6kHz and 25kHz of audio Freq.	 ±1.88% ±2.04%	
Rad Emissions Sub Meth up to 26.5GHz	±2.14dB	
Adjacent channel power	±1.47dB	(1)
Transient Frequency Response	±1.88%	
Temperature	±1.0°C	(1)
Humidity	±5.0%	

Notes: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical 1096	Eaton	94455-1	1096	08/01/17	08/01/20
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/26/17	07/26/20
Coaxial Cable - Chamber 3 cable set (backup)	Micro-Coax	Chamber 3 cable set (backup)	KMKM-0244-02 KMKM-0670-01 KFKF-0197-00	N/A	N/A
CHAMBER	Panashield	3M	N/A	12/31/2017	12/31/2019
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	03/01/17	03/01/20
Software: Field Strength Program	Timco	N/A	Version 4.10.7.0	N/A	N/A
Antenna: Passive Loop	EMCO	6512	9706-1211	07/26/17	07/26/20
EMI Test Receiver R & S ESU 40	Rohde & Schwarz	ESU 40	100320	08/28/18	08/28/20
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	N/A	N/A

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT