STC Test Report

Date : 2013-05-27

No. : HM168429

Applicant (KMA001): K-MARK INDUSTRIAL LIMITED
FLAT A, 7/F., MAI ON IND. BLDG., 17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG

Manufacturer: K-MARK INDUSTRIAL LIMITED
FLAT A, 7/F., MAI ON IND. BLDG., 17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG

Description of Sample(s): Submitted sample(s) said to be

Product:	IdentiFlyer Lyric
Brand Name:	Identiflyer
Model Number:	IF04
FCC ID:	VEPIDF-LYRIC

Date Sample(s) Received: 2013-05-02

Date Tested: 2013-05-13

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 and ANSI C63.4:2009 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s): ---

Dr. LEE Kam Chuen
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

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CONTENT:

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Appendix A

Appendix B

The Hong Kong Standards and Testing Centre Ltd.
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Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

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1.0 General Details

1.1 Equipment Under Test [EUT]
Description of Sample(s)

Submitted sample(s) said to be

Product:	IdentiFlyer Lyric
Manufacturer:	K-MARK INDUSTRIAL LIMITED FLAT A, 7/F., MAI ON IND. BLDG., 17-21 KUNG YIP STREET, KWAI CHUNG, HONG KONG
Brand Name:	Identiflyer
Model Number:	IF04
Input Voltage:	4.5Vd.c. (“AAA” size battery x 3)

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a K-MARK INDUSTRIAL LIMITED. IdentiFlyer Lyric is radio equipment with a contactless card interface (13.56MHz with an internal antenna).

1.3 Date of Order

2013-05-02

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2013-05-13

1.6 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 Regulations and ANSI C63.4:2009 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.225(a)	ANSI C63.4:2009	N/A	☒	☐	☐
Frequency Tolerance	FCC 47CFR 15.225(e)	ANSI C63.4:2009	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.225 (d) FCC 47CFR 15.209	ANSI C63.4:2009	N/A	☒	☐	☐
In-band spurious field strength	FCC 47CFR 15.225 (a)(b)(c)	ANSI C63.4:2009	N/A	☒	☐	☐

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.225
Test Method:	ANSI C63.4:2009
Test Date:	2013-05-13
Mode of Operation:	Tx on mode

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

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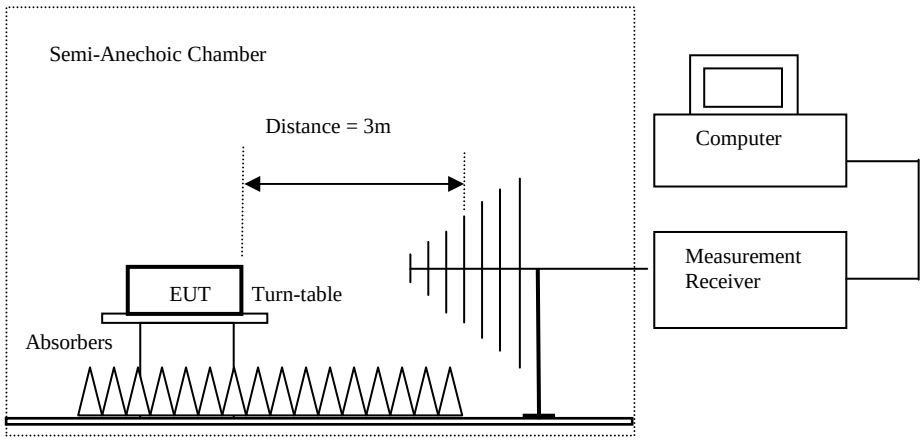
Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Ground Plane

Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

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Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.225 (a)]:

Frequency Range [MHz]	Field Strength [μV/m at 3 meters]	Field Strength [dBμV/m at 3 meters]
13.553-13.567	1,584,893.0	124

Results of Tx on mode (9kHz – 30MHz): Pass

Field Strength of Fundamental Emissions Peak Value @ 3m						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
13.57	32.1	10.2	42.3	130.3	15,848,932.0	Horizontal

Field Strength of Fundamental Emissions Average Value @ 3m						
Frequency MHz	Measured Level dBuV	Correction Factor dB/m	Field Strength dBuV/m	Field Strength uV/m	Limit uV/m	E-Field Polarity
13.57	28.7	10.2	38.9	88.1	1,584,893.0	Horizontal

Remarks:
Measurement were performed at 3m and the limit was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) .
3m to 30m Extrapolation factor = 40 $\log_{10}(d_1/d_2)$ = 40 $\log_{10}(3/30)$ = 40dB
3m limit = 30m limit + extrapolation factor
= 84dBuV/m + 40dB
= 124 dBuV/m
= 1,584,893.0μV/m

*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 9kHz to 30MHz 1.8dB
30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [µV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Results of Tx on mode (30MHz – 1000MHz): Pass

Field Strength of Spurious Emissions Quasi-Peak Value						
Frequency MHz	Measured Level dBµV	Correction Factor dB/m	Field Strength dBµV/m	Field Strength µV/m	Limit µV/m	E-Field Polarity
197.80	17.7	11.7	29.4	29.5	150.0	Horizontal
297.20	7.7	15.6	23.3	14.6	200.0	Horizontal
393.90	10.7	18.5	29.2	28.8	200.0	Horizontal
570.20	0.1	21.4	21.5	11.9	200.0	Horizontal
798.10	0.1	24.8	24.9	17.6	200.0	Horizontal
959.60	0.5	26.8	27.3	23.2	200.0	Horizontal

Remarks:
*: Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 9kHz to 30MHz 1.8dB
30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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Frequency Tolerance [FCC 47 CFR 15.225 (e)]:

Ambient Temperature: 23°C Relative Humidity: 51%

Nominal transmit frequency: 13.56MHz

Results of Tx on mode: Pass

Test conditions		Carrier Frequency		
		Carrier Frequency (MHz)	Frequency Drift (kHz)	Frequency Drift (%)
T = 20°C	Voltage = 4.50V	13.56420	---	---
	Voltage = 3.8V	13.56420	0.00	0.00
	Voltage = 5.7V	13.56425	0.05	-0.00037
T = 50°C	Voltage = 4.5V	13.56413	-0.07	0.000516
T = 40°C	Voltage = 4.5V	13.56425	0.05	-0.00037
T = 30°C	Voltage = 4.5V	13.56405	-0.15	0.001106
T = 10°C	Voltage = 4.5V	13.56425	0.05	-0.00037
T = 0°C	Voltage = 4.5V	13.56430	0.10	-0.00074
T = -10°C	Voltage = 4.5V	13.56420	0.00	0.00
T = -20°C	Voltage = 4.5V	13.56425	0.05	-0.00037
Measurement uncertainty		$< \pm 1 * 10^{-7}$		

LIMIT The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

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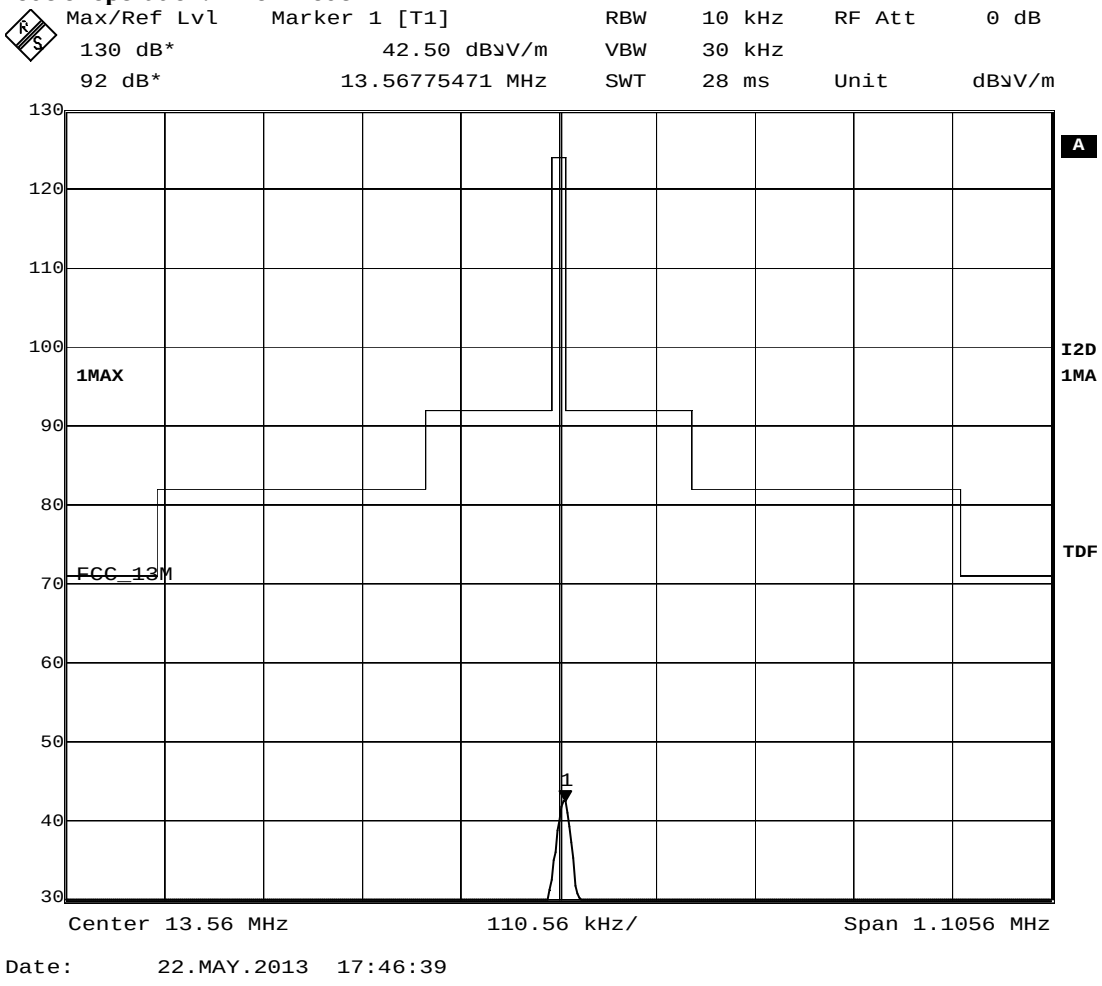
In Band radiated spurious field strength [FCC 47 CFR 15.225 (a) (b) (c)]:

Frequency Range [MHz]	Field Strength [μV/m at 3 meters]	Field Strength [dBμV/m at 3 meters]
13.553-13.567	1,584,893.0	124
13.410–13.553 MHz and 13.567–13.710 MHz	33496.5	90.5
13.110–13.410 MHz and 13.710–14.010 MHz	10592.5	80.5

Mode of operation: Tx on mode



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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM299	DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA	ETS-LINDGREN	3115	00114120	2012/01/25	2014/01/25
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-LINDGREN	FACT-3	--	2012/10/25	2013/10/25
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2013/05/07	2014/05/07
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2011/09/14	2013/09/14

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

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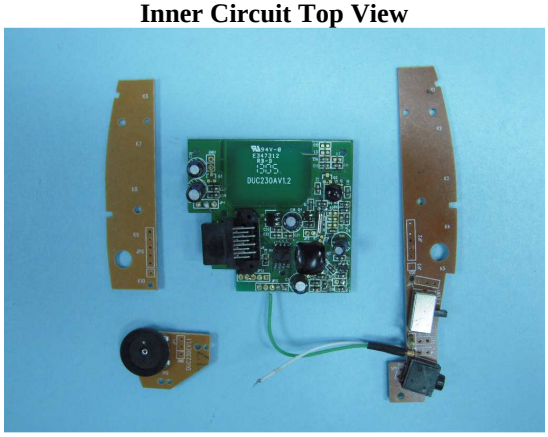
Appendix B

Photographs of EUT

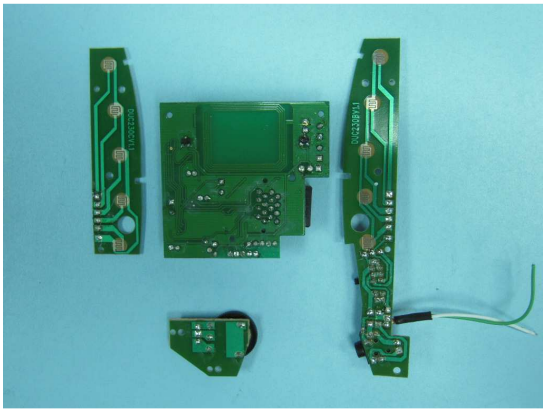
Front View of the product

Rear View of the product

Inner Circuit Top View



Inner Circuit Bottom View



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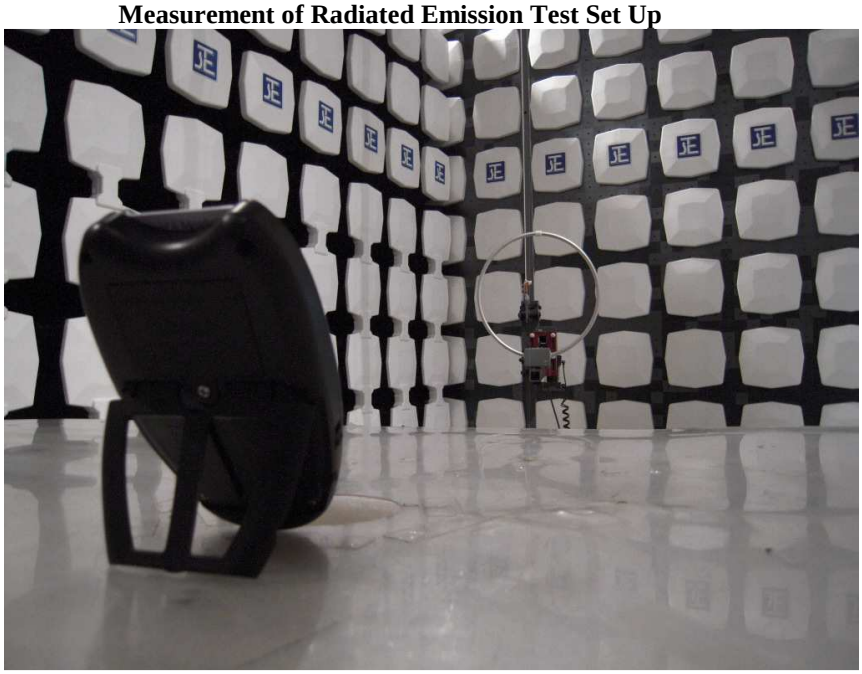
Photographs of EUT

Measurement of Radiated Emission Test Set Up



******* End of Test Report *******

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