

Date : 2016-10-07 Page 1 of 18 No. : HM170434

Applicant: K-Mark Industrial Limited.

Flat A, 7/F., Mai On Ind. Bldg 17-21 Kung Yip St., Kwai Chung,

Hong Kong.

Manufacturer: K-Mark Industrial Limited.

Flat A, 7/F., Mai On Ind. Bldg 17-21 Kung Yip St., Kwai Chung,

Hong Kong.

Description of Sample(s): Product: Simple Relay

Brand Name: Hearing Lab Technology, LLC

Model Number: 150701

FCC ID: VEP-SQC7B00

Date Sample(s) Received: 2016-08-30

Date Tested: 2016-08-30 to 2016-10-07

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance

with FCC 47CFR [Codes of Federal Regulations] Part 15: 2014 and

ANSI C63.10:2013 for FCC Certification.

Conclusion(s): The submitted product <u>COMPLIED</u> 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):



Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of

The Hong Kong Standards and Testing Centre Ltd.



Date: 2016-10-07 Page 2 of 18 : HM170434 **CONTENT:** Cover Page 1 of 18 Content Page 2 of 18 **1.0 General Details** 1.1 Equipment Under Test [EUT] Page 3 of 18 Description of EUT operation 1.2 Description of EUT Operation 1.3 Date of Order Page 3 of 18 Page 3 of 18 1.4 Submitted Sample 1.5 **Test Duration** Page 3 of 18 1.6 Country of Origin Page 3 of 18 1.7 RF Module Details Page 4 of 18 1.8 Antenna Details Page 4 of 18 **2.0 Technical Details** 2.1 Page 5 of 18 Investigations Requested 2.2 Test Standards and Results Summary Page 5 of 18 3.0 **Test Results** 3.1 Emission Page 6-12 of 18 3.2 Bandwidth Measurement Page 13-14 Appendix A List of Measurement Equipment Page 15 of 18

The Hong Kong Standards and Testing Centre Limited

Page 16-18 of 18

Appendix B

Photographs



Date : 2016-10-07 Page 3 of 18

No. : HM170434

1.0 General Details

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

Product: Simple Relay

Manufacturer: K-Mark Industrial Limited.

Flat A, 7/F., Mai On Ind. Bldg 17-21 Kung Yip St., Kwai Chung, Hong

Kong.

Brand Name: Hearing Lab Technology, LLC

Model Number: 150701

Rating: Adapter Input: 100-240Va.c. 50/60Hz 0.25A;

Output: 5.0Vd.c. 1.0A.

Battery: 3.7Vd.c., 570mAh rechargeable battery

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is a r.f. audio device of K-Mark Industrial Limited. The EUT is a wireless communication device. The EUT carrier frequency is 10.35 MHz, Modulation by CPFSK.

1.3 Date of Order

2016-08-30

1.4 Submitted Sample(s):

2 set Sample(s)

1.5 Test Duration

2016-08-30 to 2016-09-02

1.6 Country of Origin

China



Date : 2016-10-07 Page 4 of 18

No. : HM170434

1.7 RF Module Details

Module Model Number: NxH2180 Module FCC ID: N/A

Modulation: Continuous Phase Frequency Shift Keying (CP-FSK)

Carrier Frequencies: 10.2MHz to 11.0MHz

Module Specification (specification provided by manufacturer)

1.8 Antenna Details

Antenna Type: Ferrite Rod antenna

Antenna Gain: 10dB

Antenna Type: Uni-directional

Antenna Gain: 0dB



Date : 2016-10-07 Page 5 of 18

No. : HM170434

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2015 Regulations and ANSI C63.10:2013 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary									
Test Condition	Test Requirement	Test Method	Class /	Test I	Result				
			Severity	Pass	Fail				
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.10:2013	N/A	\boxtimes					
Conducted Emissions	FCC 47CFR 15.207	ANSI C63.10:2013	N/A	\boxtimes					

Note: N/A - Not Applicable



Date : 2016-10-07 Page 6 of 18

No. : HM170434

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement: FCC 47CFR 15.209
Test Method: ANSI C63.10:2013
Test Date: 2016-08-30
Mode of Operation: 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.



Date : 2016-10-07 Page 7 of 18

No. : HM170434

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

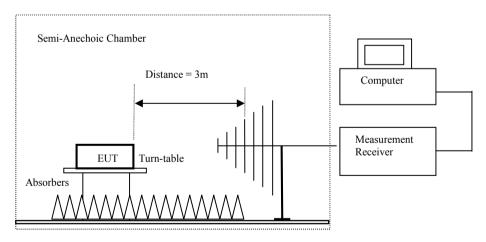
Above 1GHz (Pk & Av) RBW: 3MHz

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.



Date : 2016-10-07 Page 8 of 18

No. : HM170434

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

According to FCC Part 15.33 for an intentional radiator operates below 10 GHz, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

According to FCC Part 15.215(b) the unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in the table above. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission.

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.

Result of Tx mode (including hearing aid function), (9kHz - 30MHz): PASS

Field Strength of Fundamental and Harmonics Emissions									
	Peak Value								
Frequency	Measured	Correction	Distance	Field	Field	Limit	E-Field		
	Level	Factor	Factor	Strength	Strength		Polarity		
	@3m		3m to 30m	@30m	@30m	@30m			
MHz	$dB\mu V/m$	$dB\mu V/m$	dB	$dB\mu V/m$	$\mu V/m$	$\mu V/m$			
10.35	51.3	11.5	-40.0	22.8	13.8	30.0	Horizontal		

Field Strength of Fundamental and Harmonics Emissions									
			Averaş	ge Value					
Frequency	Measured	Correction	Distance	Field	Field	Limit	E-Field		
	Level	Factor	Factor	Strength	Strength		Polarity		
	@3m		3m to 30m	@30m	@30m	@30m			
MHz	$dB\mu V/m$	$dB\mu V/m$	dB	$dB\mu V/m$	$\mu V/m$	$\mu V/m$			
10.35	50.6	11.5	-40.0	22.1	12.7	30.0	Horizontal		

^{*}Remark

⁻ The distance factor for 3m to 30m measurement result = -40 dB.



Date : 2016-10-07 Page 9 of 18

No. : HM170434

Result of Tx mode (including hearing aid function), (30MHz – 1GHz): PASS

	Field Strength of Fundamental and Harmonics Emissions									
	Quasi-Peak Value									
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field				
	Level @3m	Factor	Strength	Strength		Polarity				
MHz	$dB\mu V/m$	$dB\mu V/m$	$dB\mu V/m$	$\mu V/m$	$\mu V/m$					
^ 10.35	51.3	11.5	62.8	1,380.4	N/A	Horizontal				
54.4	17.7	6.8	24.5	16.8	100	Vertical				
52.9	23.0	6.8	29.8	30.9	100	Horizontal				
133.8	18.2	7.7	25.9	19.7	150	Horizontal				
288.0	11.8	13.7	25.5	18.8	200	Horizontal				
368.0	23.6	16.2	39.8	97.7	200	Horizontal				
384.0	15.4	16.7	32.1	40.3	200	Vertical				

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.9dB

[^] Fundamental emission



Date : 2016-10-07 Page 10 of 18

No. : HM170434

3.1.3 Conducted Emissions (0.15MHz to 30MHz)

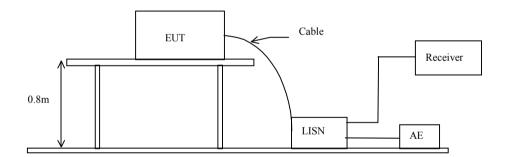
Test Requirement: FCC 47CFR 15.207 Test Method: ANSI C63.10:2013

Test Date: 2016-09-02 Mode of Operation: On mode Test Voltage: 120Va.c., 60Hz

Test Method:

The test was performed in accordance with ANSI C63.10: 2013, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:





Date : 2016-10-07 Page 11 of 18

No. : HM170434

Limit for Conducted Emissions (FCC 47 CFR 15.207):

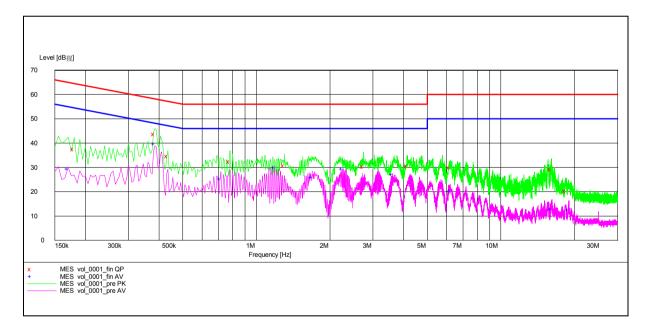
Frequency Range	Quasi-Peak Limits	Average
[MHz]	[dBµV]	[dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

^{*} Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of on mode: PASS

Please refer to the following diagram for individual results.





Date : 2016-10-07 Page 12 of 18

No. : HM170434

Results of on mode: PASS

		Quasi-peak		Ave	rage
Conductor	Frequency	Level	Limit	Level	Limit
Live or Neutral	MHz	dΒμV	dΒμV	dΒμV	dΒμV
Live	0.160	35.4	66.0	_*_	_*_
Live	0.235	_*_	_*_	22.9	52.0
Live	0.385	44.0	58.0	-*-	_*_
Live	1.125	_*_	_*_	22.9	46.0
Live	1.615	_*_	_*_	23.1	46.0
Live	2.250	26.1	56.0	_*_	_*_
Live	2.335	_*_	_*_	24.0	46.0
Live	16.110	21.1	60.0	_*_	_*_
Neutral	0.380	_*_	_*_	34.2	48.0
Neutral	0.435	19.2	57.0	_*_	_*_
Neutral	0.510	_*_	_*_	22.7	46.0
Neutral	0.915	24.7	56.0	_*_	_*_
Neutral	1.615	25.8	56.0	_*_	_*_
Neutral	4.210	22.6	56.0	_*_	_*_
Neutral	4.265	_*_	_*_	21.0	46.0
Neutral	6.145	18.5	60.0	_*_	_*_
Neutral	6.240	_*_	_*_	16.1	50.0
Neutral	15.995	_*_	_*_	10.2	50.0
Neutral	18.370	14.6	60.0	_*_	_*_
Neutral	18.885	_*_	_*_	6.9	50.0

Remarks:

Calculated measurement uncertainty (0.15MHz - 30MHz): 3.25dB

-*- Emission(s) that is far below the corresponding limit line.



Date : 2016-10-07 Page 13 of 18

No. : HM170434

3.2 20dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.215 Test Method: ANSI C63.10:2013

Test Date: 2016-10-07 Mode of Operation: Tx mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.



Date : 2016-10-07 Page 14 of 18

No. : HM170434

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range	20dB Bandwidth	FCC Limits		
[MHz]	[kHz]	[MHz]		
10.5	769.539	N/A		

	Marker	1 [T1 ndB]	RBW	10 k	Hz R	F Att	0 dB
Ref Lvl	ndB	20.00 c	db VBW	30 k	Hz		
77 db y v	BW 769	.53907816	KHZ SWT	50 m	s U	nit	dB y V
7				v ₁	[T1]	44.	72 dB y V
						10.4501 7	234 MHz
				ndE			.00 dB
				BW		69.53907	
				∇_{T}			90 db y v
		Ι	Ι Λ	∇⊕⊄		10.06322	
		11	1 /	▼ T2	2 [T1]	24.	
1MAX		مها لها	My	a		10.83276	553 MHZ
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Date : 2016-10-07 Page 15 of 18 No. : HM170434

Appendix A

LIST OF MEASUREMENT EQUIPMENT

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
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		2016/04/24	2017/04/24
EM355	BICONILOG ANTENNA	ETS-LINDGREN	3143B	00094856	2016/03/03	2018/03/03
EM229	EMI TEST RECEIVER	R&S	ESIB40	100248	2016/06/01	2017/06/01
EM353	LOOP ANTENNA	ETS_LINDGREN	6502	00206533	2016/03/16	2018/03/16

Line Conducted

Line conducted								
EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL		
EM119	LISN	R & S	ESH3-Z5	0831.5518.52	2015/10/22	2016/10/22		
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2016/06/01	2017/06/01		
EM179	IMPULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	357- 8810.52/54	2016/01/11	2017/01/11		
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740- 057-99A	2012/02/03	2017/02/03		
N/A	MEASUREMENT AND EVALUATION SOFTWARE	ROHDE & SCHWARZ	ESIB-K1	V1.20	N/A	N/A		

Remarks:

CM Corrective Maintenance

N/A Not Applicable or Not Available

TBD To Be Determined



Date : 2016-10-07 Page 16 of 18

No. : HM170434

Appendix B

Photographs of EUT

Front View of the product



Rear View of the product



Inner Circuit Top View



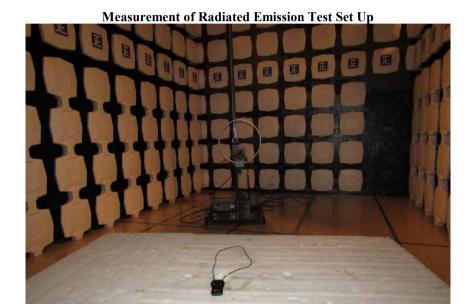
Inner Circuit Bottom View

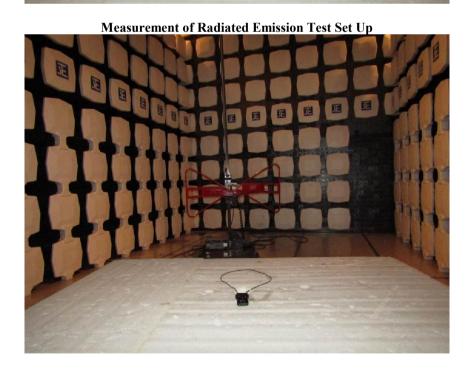




Date : 2016-10-07 Page 17 of 18 No. : HM170434

Photographs of EUT





The Hong Kong Standards and Testing Centre Limited

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Date : 2016-10-07 Page 18 of 18 No. : HM170434

Photographs of EUT

Measurement of Conducted Emission Test Set Up



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

Conditions of Issuance of Test Reports

- 1. All samples and goods are accepted by The Hong Kong Standards & Testing Centre Limited (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The Company provides its services on the basis that such terms and conditions constitute express agreement between the Company and any person, firm or company requesting its services (the "Clients").
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- 3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders
- 4. The Report refers only to the sample tested and does not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.
- 5. In the event of the improper use the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
- 6. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
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- 8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
- 9. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.
- 10. Issuance records of the Report are available on the internet at www.stc-group.org. Further enquiry of validity or verification of the Reports should be addressed to the Company.