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No. : HM158504

Applicant (KOI004): Kolf Industries (H.K.) Ltd.

No. 1, 2/F., Sing Win Ind. Bldg., 15-17 Shing Yip St.,

Kwun Tong, Kowloon, Hong Kong.

Manufacturer: Kolf Industries (H.K.) Ltd.

No. 1, 2/F., Sing Win Ind. Bldg., 15-17 Shing Yip St.

Kwun Tong, Kowloon, Hong Kong.

Description of Samples: Model Name: **RF** Remote

> **Brand Name:** JBL Model Number: REM40 FCC ID: U9FREM40

2007-03-31 **Date Samples Received:**

Date Tested: 2007-04-12

Investigation Requested: Perform ElectroMagnetic Interference measurement in

> accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2006 and ANSI C63.4:2003 for FCC Certification.

Conclusions: 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.

Remarks:

LEE Kam Chuen, ElectroMagnetic Compatibility Department For and on behalf of

The Hong Kong Standards and Testing Centre Ltd.



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1.0 **General Details**

1.1 **Test Laboratory**

The Hong Kong Standards and Testing Centre Ltd. **EMC Laboratory** 10 Dai Wang Street, Taipo Industrial Estate New Territories, Hong Kong

Telephone: 852 2666 1888 Fax: 852 2664 4353

1.2 **Applicant Details Applicant**

Kolf Industries (H.K.) Ltd. No. 1, 2/F., Sing Win Ind. Bldg., 15-17 Shing Yip St., Kwun Tong, Kowloon, Hong Kong.

HKSTC Code Number for Applicant

Manufacturer

Kolf Industries (H.K.) Ltd. No. 1, 2/F., Sing Win Ind. Bldg., 15-17 Shing Yip St., Kwun Tong, Kowloon, Hong Kong.

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong



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1.3 Equipment Under Test [EUT] Description of Sample

Product: RF Remote

Manufacturer: Kolf Industries (H.K.) Ltd.

Brand Name: JBL
Model Number: REM40

Rating: 3Vd.c ("CR2032" size battery x 1)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Kolf Industries (H.K.) Ltd., RF Remote. The transmitter is a 7 buttons transmitter. The EUT continues to transmit while button is being pressed. It is button transmitter, Modulation by IC; and type is pulse modulation.

1.4 Date of Order

2007-03-31

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2007-04-12

1.7 Country of Origin

China

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2.0 **Technical Details**

2.1 **Investigations Requested**

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2006 and ANSI C63.4:2003 for FCC Certification.

Test Standards and Results Summary Tables

EMISSION Results Summary									
Test Condition	Test Condition Test Requirement Test Method Class / Test Result								
			Severity	Pass	Failed	N/A			
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.231a	ANSI C63.4:2003	N/A						
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	N/A						

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 – 1000MHz)

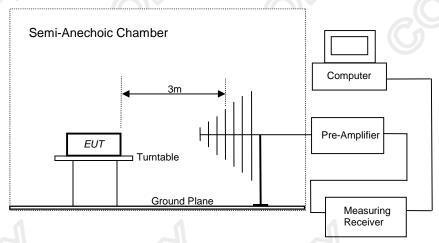
Test Requirement: FCC 47CFR 15.231a
Test Method: ANSI C63.4:2003
Test Date: 2007-04-12
Mode of Operation: Tx mode

Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. 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. The emissions worst-case are shown in Test Results of the following pages.

*: Semi-anechoic chamber located on the G/F of HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

Frequency Range of	Field Strength of	Field Strength of
Fundamental	Fundamental Emission	Spurious Emission
	[Average]	[Average]
[MHz]	$[\mu V/m]$	$[\mu V/m]$
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750 *	125 to 375 *
174-260	3,750	375
260-470	3,750 to 12,500 *	375 to 1,250 *
Above 470	12,500	1,250

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, V/m at 3 meters=56.81818(F)-6136.3636; for the band 260-470 MHz, V/m at 3 meters =41.6667(F)-7083.3333. The maximum permissible unwanted emission level is 20dB below the maximum permitted fundamental level.

Results:

	Field Strength of Fundamental Emissions								
Peak Value									
Frequency	Measured	Correction	Field	Field	Limit	E-Field			
	Level @3m	Factor	Strength	Strength	@3m	Polarity			
MHz	$dB\mu V$	dB/m	$dB\mu V/m$	μV/m	μV/m				
433.90	62.1	18.4	80.5	10592.5	109,958.5	Horizontal			

	Field Strength of Spurious Emissions									
	Peak Value									
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field				
	Level @3m	Factor	Strength	Strength		Polarity				
MHz	dΒμV	dB/m	dBμV/m	$\mu V/m$	$\mu V/m$					
867.80	42.1	25.7	67.8	2454.7	10,995.8	Horizontal				
+ 1301.70	< 1.0	26.7	< 27.7	< 24.3	5,000.0	Vertical				
1735.60	< 1.0	32.2	< 33.2	< 45.7	10,995.8	Vertical				
2169.50	< 1.0	38.8	< 39.8	< 97.7	10,995.8	Vertical				
2603.40	< 1.0	17.4	< 18.4	< 8.3	10,995.8	Vertical				
3037.30	< 1.0	17.2	< 18.2	< 8.1	10,995.8	Vertical				
3471.20	< 1.0	18.8	< 19.8	< 9.8	10,995.8	Vertical				
+ 3905.10	< 1.0	19.7	< 20.7	< 10.8	5,000.0	Vertical				
+ 4339.00	< 1.0	20.6	< 21.6	< 12.0	5,000.0	Vertical				



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Results:

	Field Strength of Fundamental Emissions								
Average Value									
Frequency	Measured	Correction	Field	Field	Limit	E-Field			
	Level @3m	Factor	Strength	Strength	@3m	Polarity			
MHz	$dB\mu V$	dB/m	dBμV/m	μV/m	μV/m				
433.90	51.1	18.4	69.5	2985.4	10,995.8	Horizontal			

	Field Strength of Spurious Emissions									
Average Value										
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field				
	Level @3m	Factor	Strength	Strength		Polarity				
MHz	$dB\mu V$	dB/m	dBμV/m	μV/m	$\mu V/m$					
867.80	31.1	25.7	56.8	691.8	1,099.6	Horizontal				
+ 1301.70	< 1.0	26.7	< 27.7	< 24.3	500.0	Vertical				
1735.60	< 1.0	32.2	< 33.2	< 45.7	1,099.6	Vertical				
2169.50	< 1.0	38.8	< 39.8	< 97.7	1,099.6	Vertical				
2603.40	< 1.0	17.4	< 18.4	< 8.3	1,099.6	Vertical				
3037.30	< 1.0	17.2	< 18.2	< 8.1	1,099.6	Vertical				
3471.20	< 1.0	18.8	< 19.8	< 9.8	1,099.6	Vertical				
+ 3905.10	< 1.0	19.7	< 20.7	< 10.8	500.0	Vertical				
+ 4339.00	< 1.0	20.6	< 21.6	< 12.0	500.0	Vertical				

Remarks:

Adjusted by Duty Cycle = -11.0dB

FCC Limit for Average Measurement = $41.6667(433.9MHz)-7083.3333=10,995.847\mu V/m$

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 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty 30MHz to 1GHz ±5.2dB



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Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]				
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:

Radiated Emissions Quasi-Peak								
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field		
	Level @3m	Factor	Strength	Strength		Polarity		
MHz	$dB\mu V$	dB/m	dBμV/m	μV/m	μV/m			
	Emissions detected are more than 20 dB below the FCC Limits							

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty 30MHz to 1GHz ±5.2dB



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3.2 20dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.231a

Test Method: ANSI C63.4:2003 (Section 13.1.7)

Test Date: 2007-04-12 Mode of Operation: On 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.

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Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range	20dB Bandwidth	FCC Limits *
[MHz]	[KHz]	[KHz]
433.906	124	1084.7

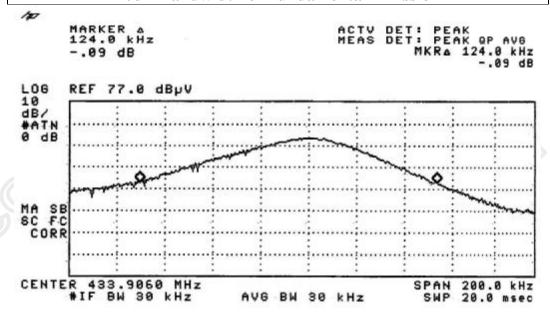
FCC Limit for Bandwidth measurement

= (0.25%)(Center Frequency)

=(0.0025)(433.906)

= 1084.7 KHz

20dB Bandwidth of Fundamental Emission





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Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL	
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	2006/12/29	2007/12/29	
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	2006/12/29	2007/12/29	
EM009	QUASIPEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	2006/12/29	2007/12/29	
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	2006/12/29	2007/12/29	
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	2006/12/29	2007/12/29	
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	2006/12/29	2007/12/29	
EM020	HORN ANTENNA	ETS-LINGGREN	3115	4032	2006/07/11	2008/07/11	
EM022	LOOP ANTENNA	ETS-LINGGREN	6502	1189-2424	2006/07/26	2008/07/26	
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB 7	100072	22007/06/08	2008/06/08	
EM215	MULTIDEVICE CONTROLER	ETS-LINGGREN	2090	00024676	N/A	N/A	
EM216	MINI MAST SYSTEM	ETS-LINGGREN	2075	00026842	N/A	N/A	
EM217	ELECTRIC POWERED TURNTABLE	ETS-LINGGREN	2088	00029144	N/A	N/A	
EM218	ANECHOIC CHAMBER	ETS-LINGGREN	FACT-3	-	2007/05/02	2008/05/02	
EM219	BICONILOG ANTENNA	ETS-LINGGREN	3142C	00029071	2006/02/01	2008/02/01	
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB 40	100248	2007/07/11	2008/07/11	
				1		=300,0	

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM119	LISN	ROHDE & SCHWARZ	ESH3-Z5	0831.5518.52	2006/07/15	2007/07/15
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB 7	100072	22007/06/08	2008/06/08
EM197	LISN	ETS-LINGGREN	4825/3	1193	2006/09/25	2007/09/25
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	2006/01/12	2008/01/12

Remarks:-

CMCorrective Maintenance

N/A Not Applicable or Not Available

TBD To Be Determined



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Appendix B

Duty Cycle Correction During 100msec

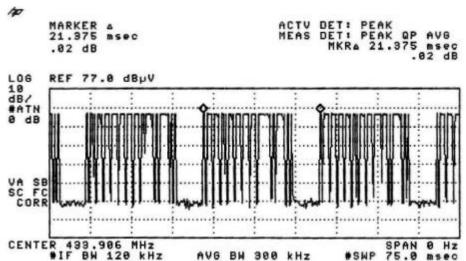
Each function key sends a different series of characters, but each packet period (21.375msec) never exceeds a series of 10 long (450µsec) or 15 short (100µsec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 10x450µsec+15x100µsec per 21.375msec=28% duty cycle. Figure A through C show the characteristics of the pulses train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.28) = -11.0dB

The following figures [Figure A to Figure C] showed the characteristics of the pulse train for one of these functions.





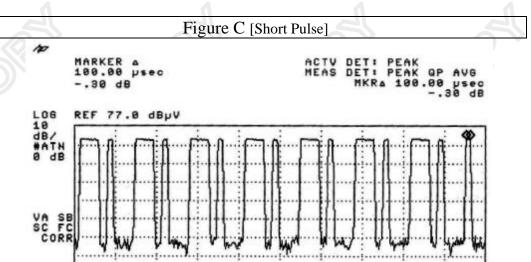
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Figure B [Long Pulse] MARKER A 450.00 psec DET: PEAK QP MKRA 450.00 -.45 dB REF 77.0 dBuV dB VA SB SC FC CORR *IF BH 120 kHz SPAN 0 Hz 20.0 msec AVG BW 300 kHz #SHP



SPAN 10.0

ENTER 433.906 MHz #IF BH 120 kHz



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Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a2). A transmitter automatically activated must automatically deactivate within not more than 5 seconds of being released. The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.

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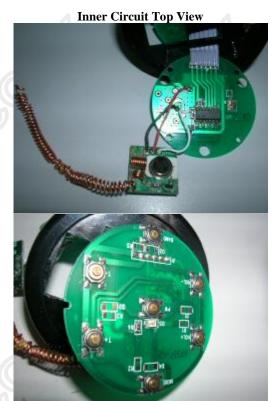
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Appendix D

Photographs of EUT







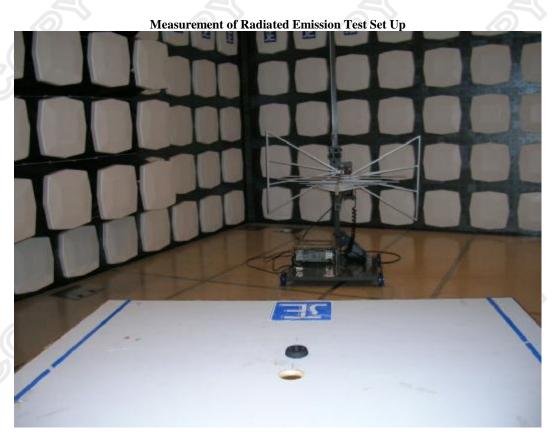




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Photographs of EUT



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