

EMC Test Report for FCC

No. 130501648SHA-002

Applicant : NINGBO KML ELECTRICAL CO., LTD.
No.707 Xiufeng Road, Gaoqiao Industry Park,
Gaoqiao Town, Yinzhou District, Ningbo, Zhejiang
315173, P.R.China

Manufacturer : NINGBO KML ELECTRICAL CO., LTD.
No.707 Xiufeng Road, Gaoqiao Industry Park,
Gaoqiao Town, Yinzhou District, Ningbo, Zhejiang
315173, P.R.China

Product Name : Plug-in Wireless Motion Activated Control

Type/Model : KUQ01RF-01

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2012): Radio Frequency Device: Subpart B; Unintentional radiators class B

ANSI C63.4 (2003): Interim Standard for Methods of Measurement of Radio-Noise
Emissions from Low-Voltage Electrical and Electronic Equipment in the
Range of 9 kHz to 40GHz.

Date of issue: July 08, 2013

Prepared by:



Nemo Li (Project Engineer)

Reviewed by:



Jonny Jing (Reviewer)

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1. GENERAL INFORMATION

1.1 Description of equipment under Test (EUT)

Product Name	:	Plug-in Wireless Motion Activated Control
Description of EUT	:	There is one model only. The EUT is a receiver to receive wireless signal so that its on/off condition can be controlled by the transmitter.
Model number	:	KUQ01RF-01
FCC ID	:	2AAFT-KUQ01RF-01
Category of EUT	:	Class B
Rating	:	120V, 60Hz, Max 1800W.
EUT type	:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Sample received date	:	May 22, 2013
Sample Identification No	:	0130522-20-007
Date of test	:	May 22~ June 5, 2013

1.2 Description of Client

Applicant: NINGBO KML ELECTRICAL CO., LTD.
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FCC ID: 2AAFT-KUQ01RF-01

1.3 Description of Test Facility

Name: Intertek Testing Services Limited Shanghai
Address: Building No.86, 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

FCC Registration Number: 236597
IC Assigned Code: 2042B-1

Name of contact: Steve Li
Tel: +86 21 64956565 ext. 214
Fax: +86 21 54262335 ext. 214

2. TEST SPECIFICATIONS

2.1 Standards

47CFR Part 15 (2012): Radio Frequency Device: Subpart B; Unintentional radiators class B

ANSI C63.4 (2003): Interim Standard for Methods of Measurement of Radio-Noise
Emissions from Low-Voltage Electrical and Electronic Equipment in the
Range of 9 kHz to 40GHz.

2.2 Mode of operation during the test / Test peripherals used

2.2.1 Description of operation

Within this test report, EUT was tested with modulation and tested under its rating voltage and frequency.

The EUT was set up and tested as typically used.

The Signal generator “SMR20” together with a transmitting antenna was employed to radiate 315MHz CW signal in close proximity to the EUT.

2.3 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESIB 26	R&S	EC 3045	2012-10-21	2013-10-20
Semi-anechoic chamber	-	Albatross project	EC 3048	2013-5-21	2014-5-20
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2013-5-16	2015-5-15
Horn antenna	HF 906	R&S	EC 3049	2013-5-13	2015-5-12
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2013-4-12	2014-4-11
Test Receiver	ESCS 30	R&S	EC 2107	2012-10-21	2013-10-20
A.M.N.	ESH2-Z5	R&S	EC 3119	2013-1-9	2014-1-8
A.M.N.	ESH3-Z5	R&S	EC 2109	2013-1-10	2014-1-9
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2013-2-8	2014-2-7
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2013-2-8	2014-2-7
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2013-2-8	2014-2-7
Band Reject Filter	WRCGV 2400/2483- 2390/2493- 35/10SS	Wainwright	EC4297-4	2013-2-8	2014-2-7
Test Receiver	FSV40	R&S	/	2012-10-21	2013-10-20
Power Splitter/Combiner	ZN2PD2-63	Mini-Circuits	815	2012-12-3	2013-12-2



2.4. Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai.

TEST ITEM	RESULT	NOTE
Disturbance voltage at a.c. mains terminal	Pass	
Radiated emission	Pass	

Notes: 1: NA =Not Applicable

3. Conducted disturbance voltage at mains terminals

Test result: Pass

3.1 Limits

3.1.1 Limits for conducted disturbance voltage at the mains ports of class A device

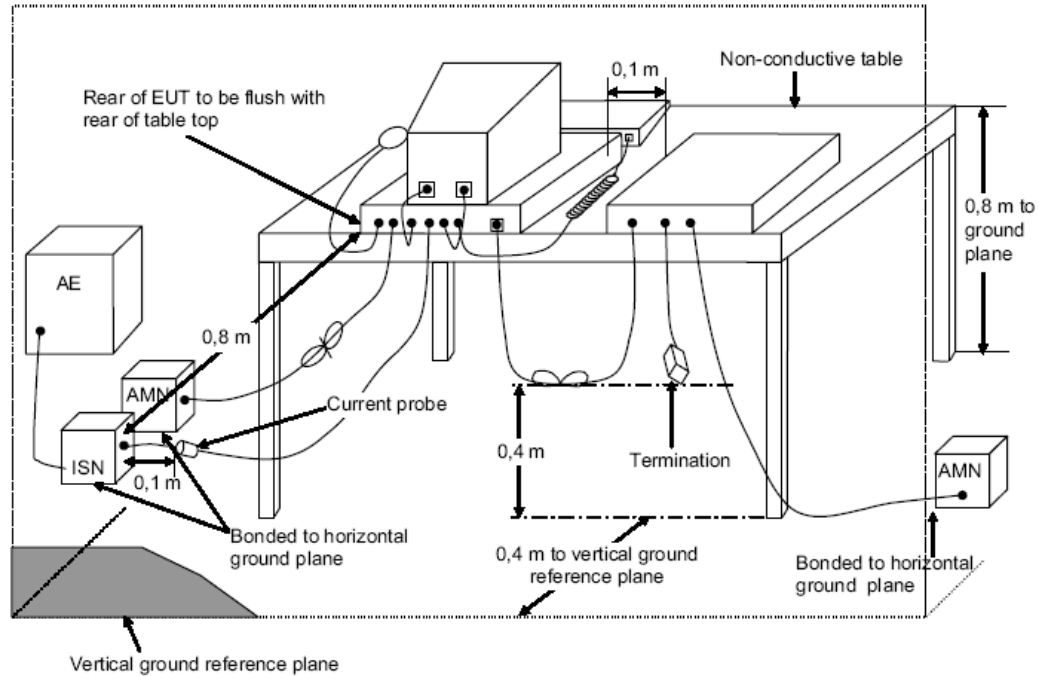
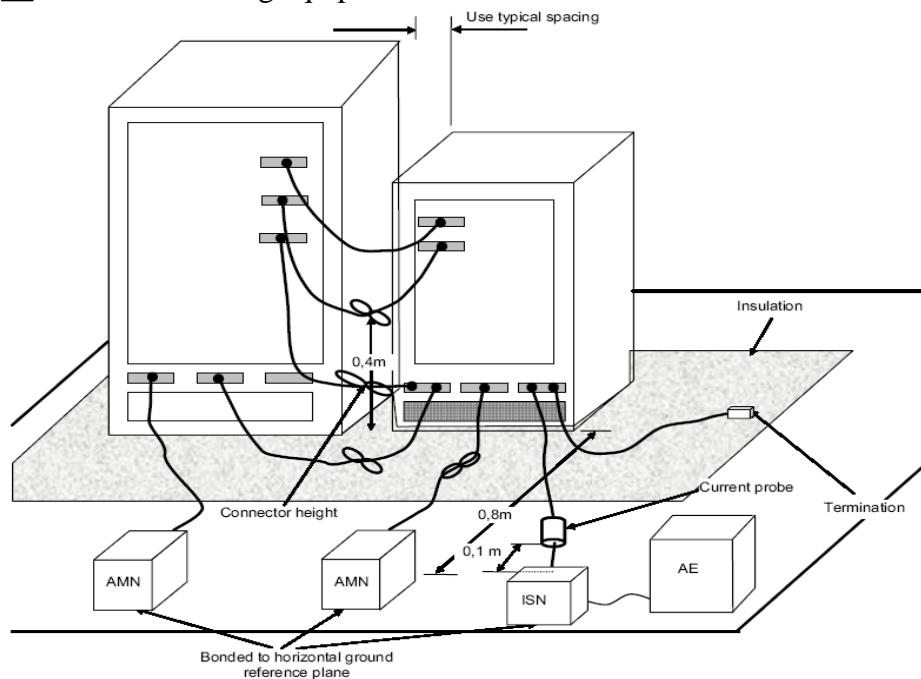
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.1.2 Limits for conducted disturbance voltage at the mains ports of class B device

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.2 Test setup

☒ For table top equipment

☐ For floor standing equipment

3.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were following clause 4 and clause 5 of ANSI 63.4.

Detailed test procedure was following clause 7.2 of ANSI 63.4.

EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

3.4 Test Protocol

Temperature : 25 °C
Relative Humidity : 55 %

Test Data:

Frequency (MHz)	Quasi-peak			Average			Line
	level dB(μV)	Limit dB(μV)	Margin (dB)	level dB(μV)	limit dB(μV)	Margin (dB)	
2.00	7.53	56.00	48.47	4.78	46.00	41.22	L
4.50	8.02	56.00	47.98	4.71	46.00	41.29	L
4.89	26.62	56.00	29.38	21.44	46.00	24.56	L
5.49	9.03	60.00	50.97	6.20	50.00	43.80	L
6.00	10.89	60.00	49.11	8.64	50.00	41.36	L
29.38	7.62	60.00	52.38	3.57	50.00	46.43	L
2.00	8.77	56.00	47.23	6.44	46.00	39.56	N
4.01	7.72	56.00	48.28	3.56	46.00	42.41	N
4.50	10.38	56.00	45.62	7.99	46.00	38.01	N
4.89	27.28	56.00	28.72	24.37	46.00	21.63	N
6.00	12.08	60.00	47.92	9.25	50.00	40.75	N
29.85	7.96	60.00	52.04	3.29	50.00	46.71	N
Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading							

Notes:

1. All possible modes of operation were investigated. Only the worst case emissions measured.

4. Radiated emission

Test result: Pass

4.1 Radiated emission limits

4.1.1 Limits for radiated disturbance of class A device

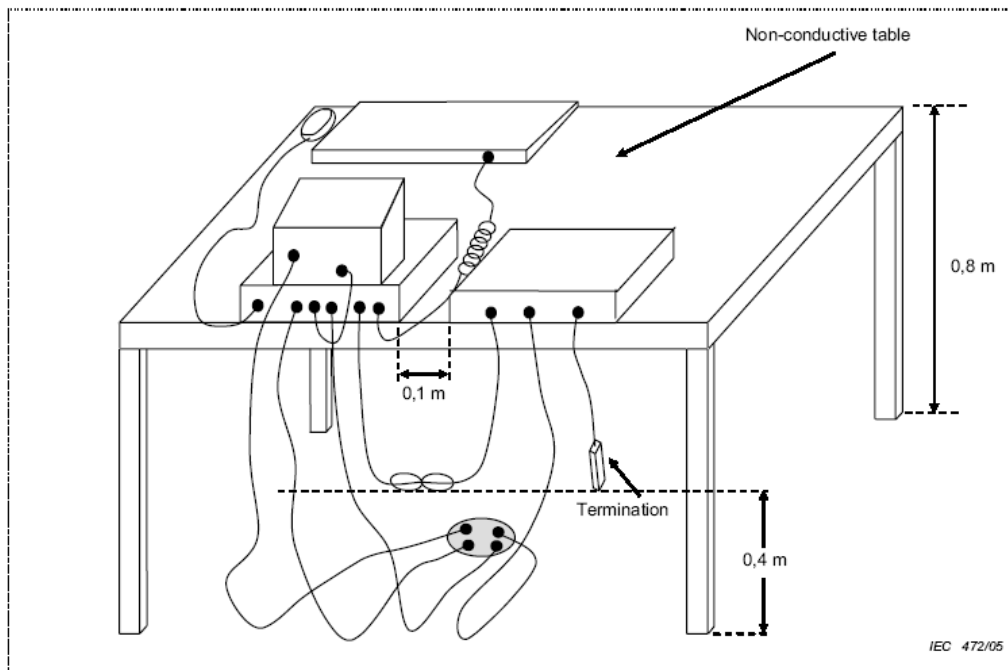
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 – 88	39
88 – 216	43.5
216 – 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.1 Limits for radiated disturbance of class B device

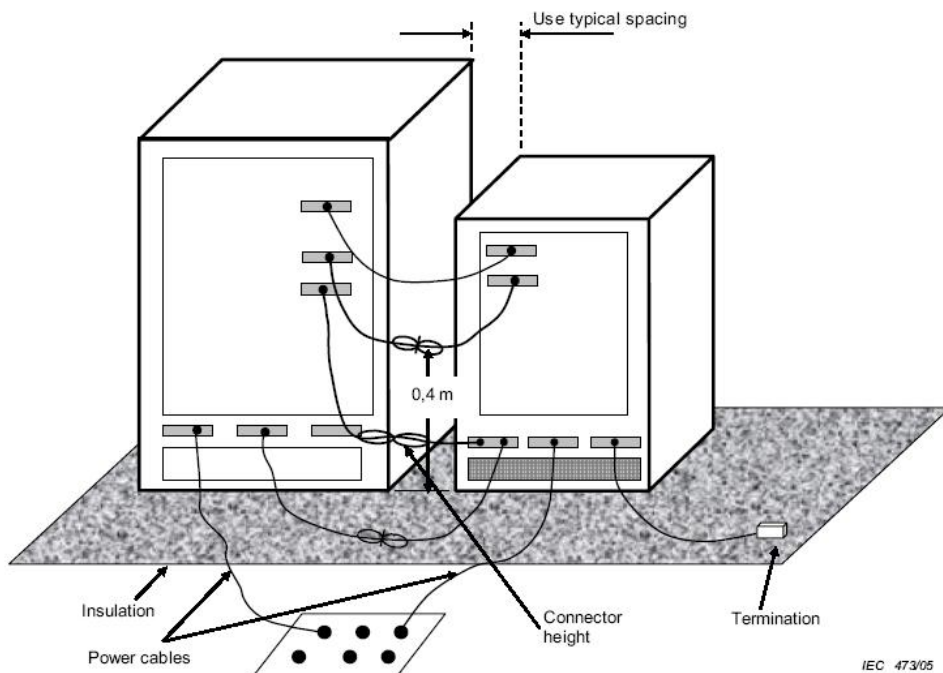
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.2 Block diagram and test set up

☒ For table top equipment



☐ For floor standing equipment



4.3 Test Setup and Test Procedure

The measurement was performed in a semi-anechoic chamber.

The distance from EUT to receiving antenna is 3 meter.

Measurement was performed according to clause 4 and clause 5 of ANSI 63.4.

Test procedure was according to clause 8.3 of ANSI 63.4.

EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz)

RBW = 1MHz, VBW = 3MHz (>1GHz for PK);

4.4 Test Protocol

Temperature : 25 °C
Relative Humidity : 55 %

Test data:

Frequency (MHz)	Corrected Reading (dBμV/m)	Correct Factor	Limits (dBμV/m)	Margin (dBμV/m)	Polarization (H/V)
30.00	22.50	21.00	40.00	17.50	H
650.10	27.40	21.80	46.00	18.60	H
955.29	31.30	24.50	46.00	14.70	H
30.00	22.80	21.00	40.00	17.20	V
657.88	27.30	21.90	46.00	18.70	V
926.13	31.50	24.40	46.00	14.50	V

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)

2. Corrected Reading = Original Receiver Reading + Correct Factor

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,

Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m