



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY
INTERNATIONAL**

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CGZ3150521-00577-EE



CTS (Ningbo) Testing Service Technology Co., Ltd.

2/F., South Tower, Huoju Building, No.181, Canghai Road,
Jiangdong Science and Technology Park, Ningbo, Zhejiang, China



TEST REPORT ETSI EN 301 489-1 V1.9.2 and ETSI EN 301 489-3 V1.6.1 Electromagnetic compatibility and Radio spectrum matters(ERM); ElectroMagnetic Compatibility(EMC) Standard for radio equipment and services Part 1: Common technical requirements Part 3: Specific conditions for Short-Range Devices(SRD)operation frequencies between 9kHz and 40GHz	
Report Reference No.	CGZ3150521-00577-EE
Date of issue	29 May 2015
Testing Laboratory Name	CTS (Ningbo) Testing Service Technology Co., Ltd.
Address	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China
Testing location/ procedure	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
Applicant's name	X-HONG INTERNATIONAL GROUP CO., LTD.
Address	1502 / UNIT 02, 15/F, RICKY CENTRE, NO. 36 CHONG YIP STREET, KWUN TONG, KOWLOON, HONGKONG
Test specification: Standard ETSI EN 301 489-1 V1.9.2, ETSI EN 301 489-3 V1.6.1 EN 61000-3-2: 2006+A2:2009, EN 61000-3-3: 2013 Test Report Form No. CTSEMC-1.0 TRF Originator..... CTS (Ningbo) Testing Service Technology Co., Ltd. Master TRF..... Dated 2009-01	
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Test item description.	Remote control quadcopter
Trade Mark	
Manufacturer	X-HONG INTERNATIONAL GROUP CO., LTD.
Model/Type reference	S18C
Ratings	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Result	PASSED

Compiled by:

Supervised by:

Approved by:

Kate zhang / File administrators

Duke yang / Technique principal

Vincent yao / Manager

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CTS (Ningbo) Testing Service Technology Co., Ltd.

2/F., South Tower, Huoju Building, No.181, Canghai Road, Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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EMC -- TEST REPORT

Test Report No. : CGZ3150521-00577-EE

29 May 2015
Date of issue

Type / Model.....	S18C
EUT.....	Remote control quadcopter
Applicant	X-HONG INTERNATIONAL GROUP CO., LTD.
Address.....	1502 / UNIT 02, 15/F, RICKY CENTRE, NO. 36 CHONG YIP STREET, KWUN TONG, KOWLOON, HONGKONG
Telephone.....	+86-754-86987989
Fax.....	/
Contact.....	/
Manufacturer	X-HONG INTERNATIONAL GROUP CO., LTD.
Address.....	1502 / UNIT 02, 15/F, RICKY CENTRE, NO. 36 CHONG YIP STREET, KWUN TONG, KOWLOON, HONGKONG
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Telephone.....	+86-754-86987989
Fax.....	/
Contact.....	/

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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2/F., South Tower, Huoju Building, No.181, Canghai Road, Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

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E-mail: cts@cts-lab.com.cn

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TABLE OF CONTENTS

Description	Page
1 TEST STANDARDS.....	5
2 SUMMARY	5
2.1 GENERAL REMARKS	5
2.2 FINAL ASSESSMENT	5
3 EQUIPMENT UNDER TEST	6
3.1 Power supply system utilised.....	6
3.2 Short description of the Equipment under Test (EUT).....	6
3.3 EUT operation mode	6
3.4 EUT configuration	7
3.5 Performance level	7
3.6 Definition related to the performance level	7
4 TEST ENVIRONMENT	8
4.1 Address of the test laboratory	8
4.2 Test facility.....	8
4.3 Environmental conditions	8
4.4 Definitions of symbols used in this test report.....	8
4.5 Statement of the measurement uncertainty	8
4.6 Measurement Uncertainty	9
4.7 Test Description	9
5 TEST CONDITIONS AND RESULTS	10
5.1 Conducted disturbance	10
5.2 Radiated disturbance (electric field)	14
5.3 Harmonic current	20
5.4 Voltage fluctuations and flicker.....	24
5.5 Electrostatic discharge.....	27
5.6 Radiated, radio-frequency, electromagnetic field	29
5.7 Electrical fast transients / Burst	31
5.8 Surge	33
5.9 Conducted disturbances induced by radio-frequency fields	35
5.10 Voltage dips.....	37
5.11 Voltage Short interruptions.....	39
6 USED TEST EQUIPMENT	41
7 TEST PHOTOGRAPHS	44
7.1. Photo of power line conducted emission measurement (C.E.).....	44
7.2. Photo of radiated emission measurement (R.E. Electric field)	44
7.3. Photo of harmonic current and flicker emission measurement (H.&F.).....	45

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7.4. Photo of electrostatic discharge Immunity measurement (E.S.D.).....45

7.5. Photo of RF field strength Immunity measurement (R.S.).....45

7.6. Photo of EFT/surge/Dips immunity measurement (E.F.T./Surge./Dips.).....46

7.7. Photo of conducted disturbance Immunity measurement (C.S.).....46

8 External and Internal Photos of the EUT47

9 Manufacturer/ Approval holder Declaration55

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2/F., South Tower, Huoju Building, No.181, Caihong Road, Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

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1 TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 301 489-1 V1.9.2 and **ETSI EN 301 489-3 V1.6.1** Electromagnetic compatibility and Radio spectrum matters(ERM); ElectroMagnetic Compatibility(EMC) Standard for radio equipment and services.

Part 1: Common technical requirements

Part 3: Specific conditions for Short-Range Devices(SRD) operation frequencies between 9kHz and 40GHz

EN 61000-3-2: 2006+A2:2009 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3: 2013 Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	21 May 2015
Testing commenced on	21~28 May 2015
Testing concluded on	29 May 2015

2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

☒ - fulfilled.

☐ - **not** fulfilled.

The equipment under test

☒ - fulfils the EMC requirements cited on page 1.

☐ - **does not** fulfil the EMC requirements cited on page 1.

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E-mail: cts@cts-lab.com.cn

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3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage: ☒ Battery 3.7V, AC 230V/50Hz for Charging
Battery 1.5V*4 for TX
☐ Others

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

☒ - Normal

Operating Mode: Normal

Emissions tests.....: According to ETSI EN 301 489-1 V1.9.2 and ETSI EN301 489-3 V1.6.1, searching for the highest disturbance.

Immunity tests: According to ETSI EN 301 489-1 V1.9.2 and ETSI EN301 489-3 V1.6.1, searching for the highest susceptibility.

Harmonic current.....: According to EN 61000-3-2, searching for the highest disturbance.

Voltage fluctuation.....: According to EN 61000-3-3, searching for the highest disturbance.

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3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not Applicable

3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

3.6 Definition related to the performance level

Performance table for EN 301 489-3 (V 1.6.1)		
Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function . Shall be no unintentional transmissions.	Shall operate as intended . Shall be no degradation of performance (see note 2) Shall be no loss of function . Shall be no loss of stored data or user programmable Functions.
B	May show loss of function (one or more) .. May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable . Shall operate as intended after recovering . Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator . Shall operate as intended after recovering . Shall be no degradation of performance (see note 2).

NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

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Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

FCC-Registration No.: 971995

CTS (Ningbo) Testing Service Technology Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No. 971995, July 13, 2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 °C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. 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.

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4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	$\pm 1.22\text{dB}$	(1)
Power disturbance	30MHz~300MHz	$\pm 1.38\text{dB}$	(1)
Radiation emission (3m)	30MHz~300MHz	$\pm 3.14\text{dB}$	(1)
	300MHz~1000MHz	$\pm 3.18\text{dB}$	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.
- (2) The actual EUT tested items in this test report, only applies to this "measurement uncertainty" in part / all of the corresponding data.

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION(ETSI EN 301 489-1 V1.9.2 and ETSI EN301 489-3 V1.6.1)			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 55022:2006+A1:2007	Class B	PASS
Conducted disturbance at telecommunication port	EN 55022:2006+A1:2007	Class B	N/A
Radiated disturbance	EN 55022:2006+A1:2007	Class B	PASS
Harmonic current emissions	EN 61000-3-2:2006+A2:2009	Class A	PASS
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	PASS
IMMUNITY (ETSI EN 301 489-1 V1.9.2 and ETSI EN301 489-3 V1.6.1)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2: 2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	PASS
Surge (Input a.c. power ports)	IEC 61000-4-5: 2005	B	PASS
Surge (Telecommunication ports)		B	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6: 2008	A	PASS
Voltage dips, >95% reduction	IEC 61000-4-11: 2004	B	PASS
Voltage dips, 30% reduction		B	PASS
Voltage interruptions		C	PASS
N/A is an abbreviation for Not Applicable.			

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Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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5 TEST CONDITIONS AND RESULTS

5.1 Conducted disturbance

For test instruments and accessories used see section 6 part 6.2.

5.1.1 Description of the test location

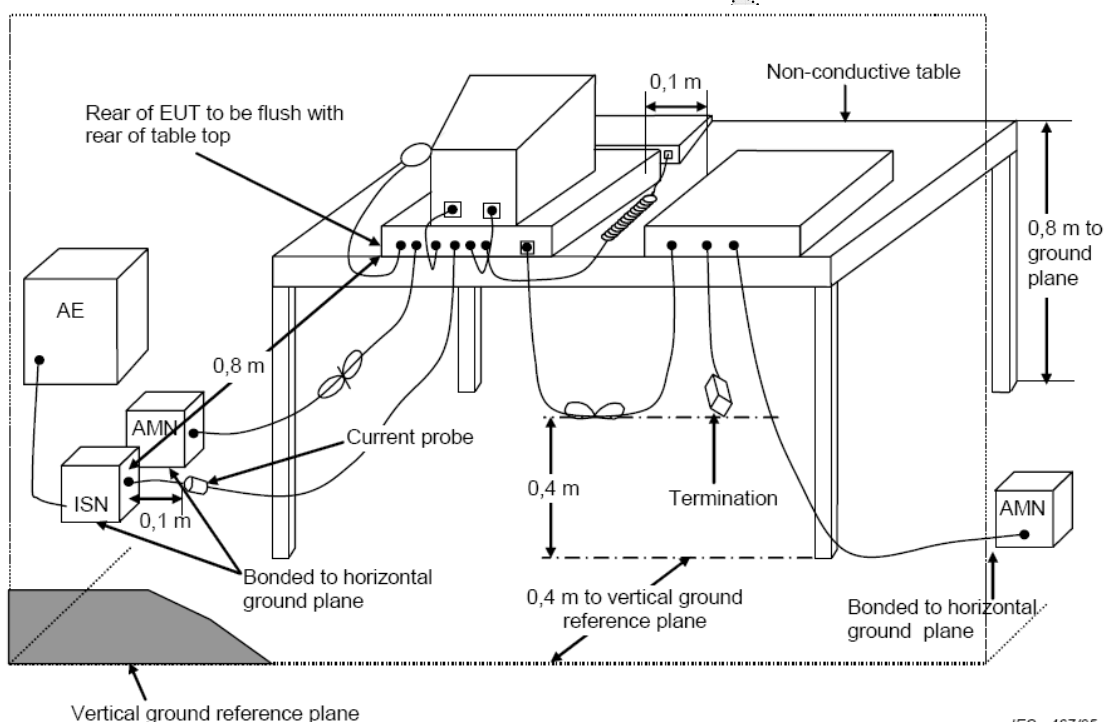
Test location: Shielded room

5.1.2 Description of the test set-up

5.1.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.1.2.2 Block Diagram of Test Setup



5.1.3 Limits disturbance

Frequency		Maximum RF Line Voltage (dBμV)	
		Quasi-peak Level	Average Level
150kHz ~ 500kHz		66 ~ 56 *	56 ~ 46 *
500kHz ~ 5MHz		56	46
5MHz ~ 30MHz		60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

5.1.4 Test result

The requirements are	Fulfilled
Band width	9kHz
Frequency range	0.15 MHz - 30 MHz
Min. limit margin	>9.39 dB at 0.15 - 30 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

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Fax: +86-20-38780406

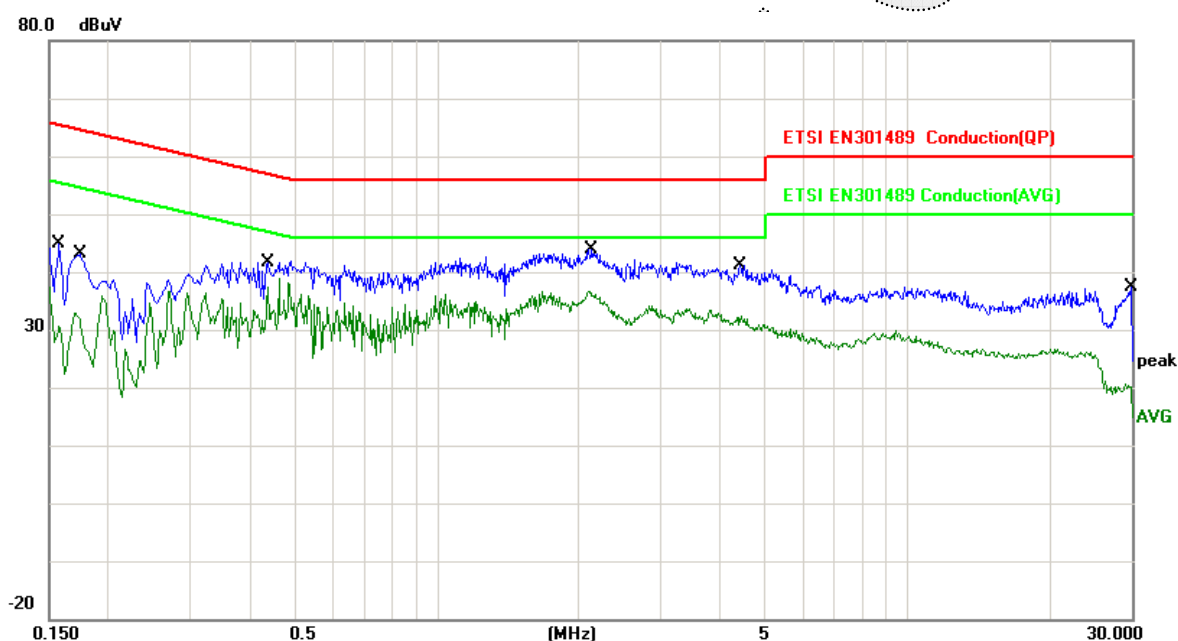
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E-mail: cts@cts-lab.com.cn

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5.1.5 Test protocol

Test point	L	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			
EUT	Remote control quadcopter		
MODEL NO.	S18C		
Operating Condition	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX		
Test Condition	Ambient Temperature: 24°C Humidity: 56%		
Operator	Duke		



No.	Frequency (MHz)	Factor (dB)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1580	10.82	27.11	37.93	65.57	-27.64	QP
2	0.1580	10.82	15.75	26.57	55.57	-29.00	AVG
3	0.1740	10.83	28.18	39.01	64.77	-25.76	QP
4	0.1740	10.83	21.09	31.92	54.77	-22.85	AVG
5	0.4380	10.89	29.30	40.19	57.10	-16.91	QP
6	0.4380	10.89	21.83	32.72	47.10	-14.38	AVG
7	2.1340	10.95	28.39	39.34	56.00	-16.66	QP
8	2.1340	10.95	23.90	34.85	46.00	-11.15	AVG
9	4.4300	11.05	25.55	36.60	56.00	-19.40	QP
10	4.4300	11.05	19.35	30.40	46.00	-15.60	AVG
11	29.9780	11.23	19.12	30.35	60.00	-29.65	QP
12	29.9780	11.23	6.20	17.43	50.00	-32.57	AVG

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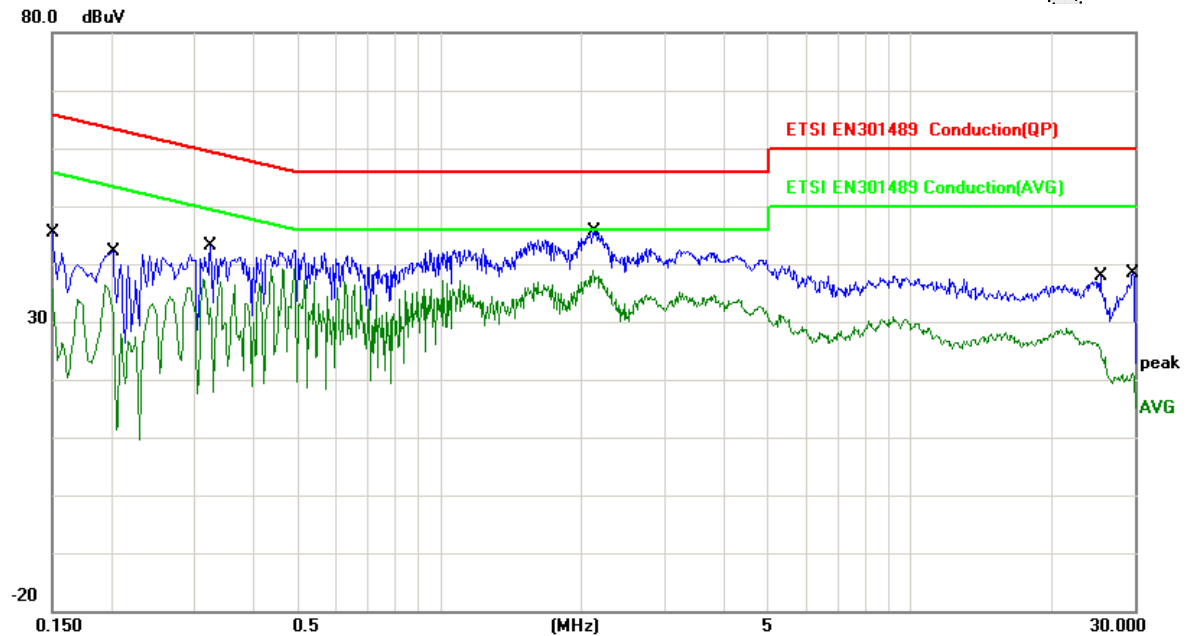
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E-mail: cts@cts-lab.com.cn

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Test point:	N	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1500	10.80	32.50	43.30	66.00	-22.70	QP
2	0.1500	10.80	27.28	38.08	56.00	-17.92	AVG
3	0.2020	10.81	26.55	37.36	63.53	-26.17	QP
4	0.2020	10.81	17.56	28.37	53.53	-25.16	AVG
5	0.3260	10.85	27.08	37.93	59.55	-21.62	QP
6	0.3260	10.85	17.30	28.15	49.55	-21.40	AVG
7	2.1220	10.93	31.30	42.23	56.00	-13.77	QP
8	2.1220	10.93	25.68	36.61	46.00	-9.39	AVG
9	25.3340	11.10	18.24	29.34	60.00	-30.66	QP
10	25.3340	11.10	12.80	23.90	50.00	-26.10	AVG
11	29.7100	11.17	19.49	30.66	60.00	-29.34	QP
12	29.7100	11.17	6.60	17.77	50.00	-32.23	AVG

Note: Level=Reading+Factor. Margin= Limit-Level

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5.2 Radiated disturbance (electric field)

For test instruments and accessories used see section 6 part 6.1.

5.2.1 Description of the test location

Test location : Semi-Anechoic chamber

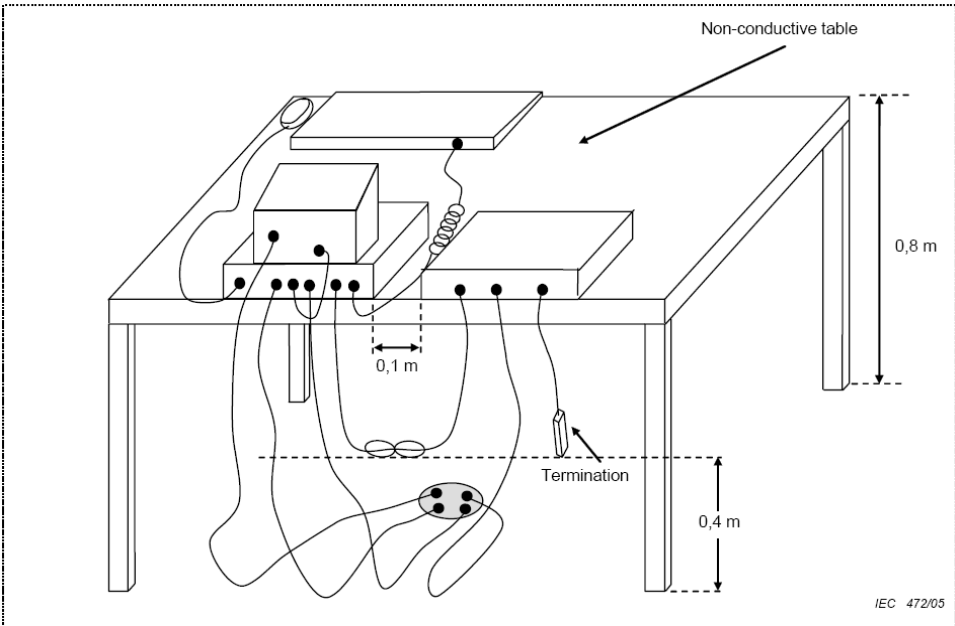
Test disturbance: 3 Meter

5.2.2 Description of the test set-up

5.2.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.2.2.2 Block Diagram of Test Setup



5.2.3 Limits of disturbance (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)		
		Peak	QP	Average
30 ~ 230	3	---	40	---
230 ~ 1000	3	---	47	---
1000~3000	3	70	---	50
3000~6000	3	74	---	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

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5.2.4 Test result

The requirements are	Fulfilled
Band width	120kHz for below 1GHz, 1MHz for above 1GHz
Frequency range	30 MHz - 6000 MHz
Min. limit margin	>2.48 dB at 30 - 6000 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

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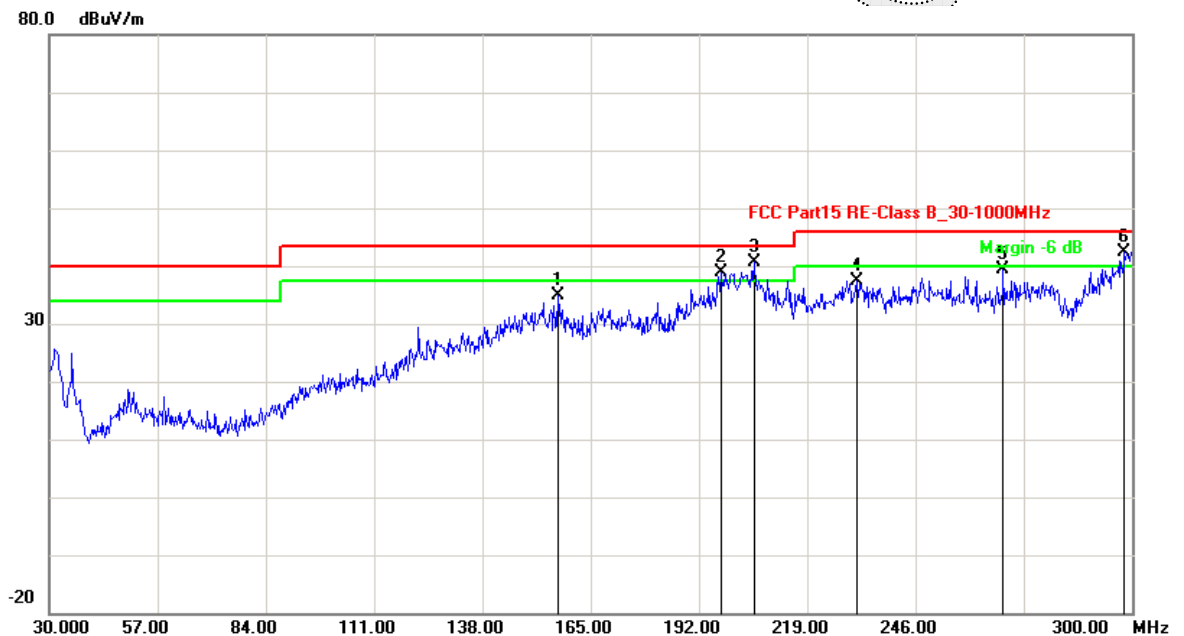
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5.2.5 Test protocol

Test point:	Horizontal	Result:	■ - passed
Operation mode	Normal		□ - not passed
Remarks:			
EUT	Remote control quadcopter		
MODEL NO.	S18C		
Operating Condition	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX		
Test Condition	Ambient Temperature: 24°C Humidity: 56%		
Operator	Duke		



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	156.9000	-15.97	50.84	34.87	43.50	-8.63	QP
2	197.4000	-12.83	51.64	38.81	43.50	-4.69	QP
3	205.7700	-11.08	51.82	40.74	43.50	-2.76	QP
4	231.4200	-11.64	48.94	37.30	46.00	-8.70	QP
5	267.8700	-10.28	49.68	39.40	46.00	-6.60	QP
6	298.1100	-1.92	44.41	42.49	46.00	-3.51	QP

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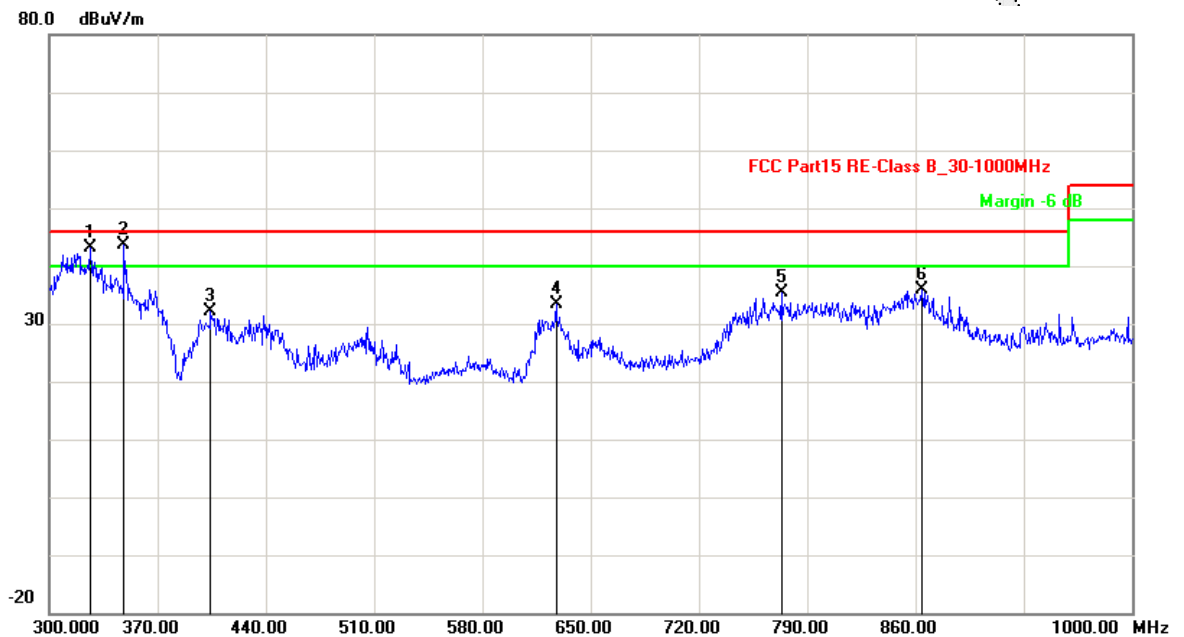
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	326.6000	-12.41	55.49	43.08	46.00	-2.92	QP
2	348.3000	-11.43	54.95	43.52	46.00	-2.48	QP
3	404.3000	-10.33	42.35	32.02	46.00	-13.98	QP
4	627.6000	-4.27	37.59	33.32	46.00	-12.68	QP
5	773.2000	-2.37	37.79	35.42	46.00	-10.58	QP
6	864.2000	-0.72	36.53	35.81	46.00	-10.19	QP

Above 1G

No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	3054.108	-3.34	37.38	34.04	74.00	-39.96	peak
2	3054.108	-3.34	23.50	20.16	54.00	-33.84	AVG
3	3915.832	-0.45	37.77	37.32	74.00	-36.68	peak
4	3915.832	-0.45	23.30	22.85	54.00	-31.15	AVG

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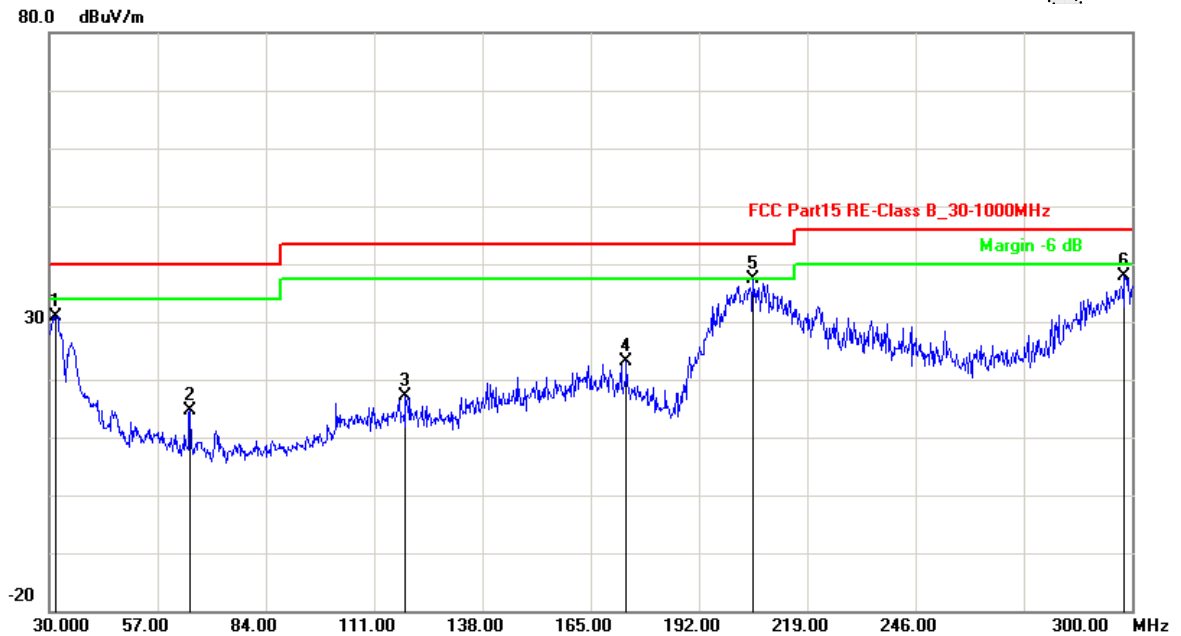
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Test point:	Vertical	Result:	<input checked="" type="checkbox"/> - passed
Operation mode	Normal		<input type="checkbox"/> - not passed
Remarks:			



No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	31.6200	-16.25	47.24	30.99	40.00	-9.01	QP
2	65.1000	-20.24	34.78	14.54	40.00	-25.46	QP
3	118.8300	-16.79	33.83	17.04	43.50	-26.46	QP
4	173.9100	-15.67	38.69	23.02	43.50	-20.48	QP
5	205.5000	-11.13	48.43	37.30	43.50	-6.20	QP
6	298.1100	-1.92	39.87	37.95	46.00	-8.05	QP

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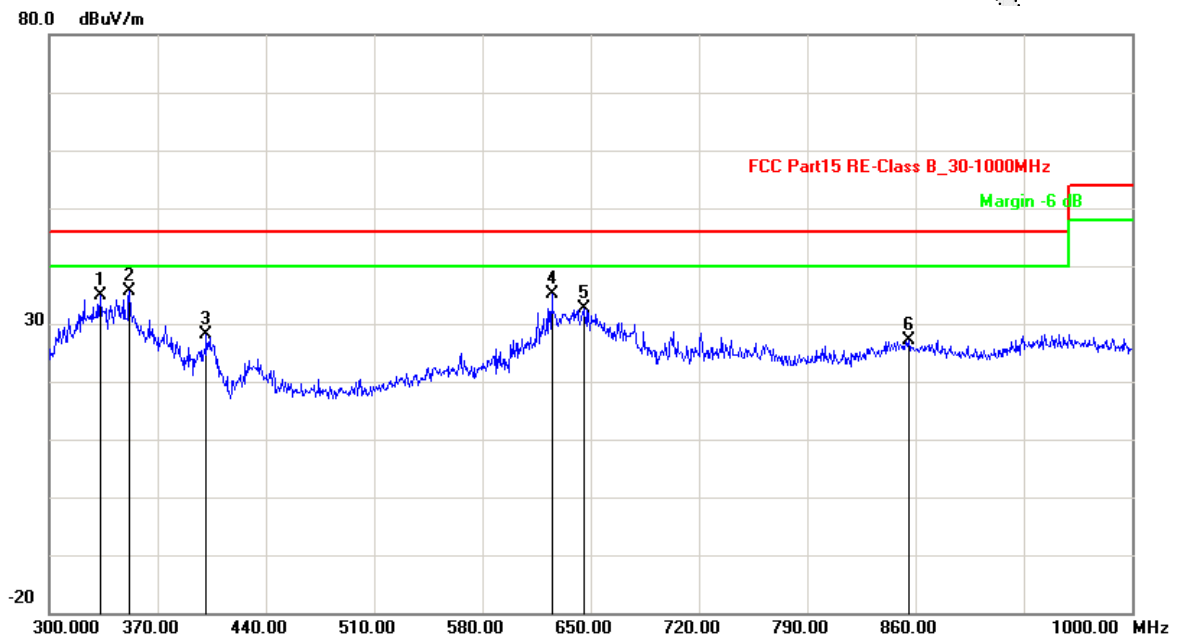
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	332.9000	-12.13	47.03	34.90	46.00	-11.10	QP
2	351.8000	-11.32	46.95	35.63	46.00	-10.37	QP
3	401.5000	-10.45	38.61	28.16	46.00	-17.84	QP
4	624.8000	-4.40	39.63	35.23	46.00	-10.77	QP
5	645.8000	-3.42	35.96	32.54	46.00	-13.46	QP
6	855.8000	-0.46	27.70	27.24	46.00	-18.76	QP

Above 1G

No.	Frequency (MHz)	Factor (dB/m)	Reading (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Det.
1	2883.768	-4.18	39.55	35.37	70.00	-34.63	peak
2	2883.768	-4.18	25.53	21.35	50.00	-28.65	AVG
3	3875.752	-0.57	38.19	37.62	74.00	-36.38	peak
4	3875.752	-0.57	23.25	22.68	54.00	-31.32	AVG

Note: Level=Reading+Factor. Margin= Limit-Level

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5.3 Harmonic current

For test instruments and accessories used see section 6 part 6.3.

5.3.1 Description of the test location

Test location : Test location no. 1

5.3.2 Limits of harmonic current

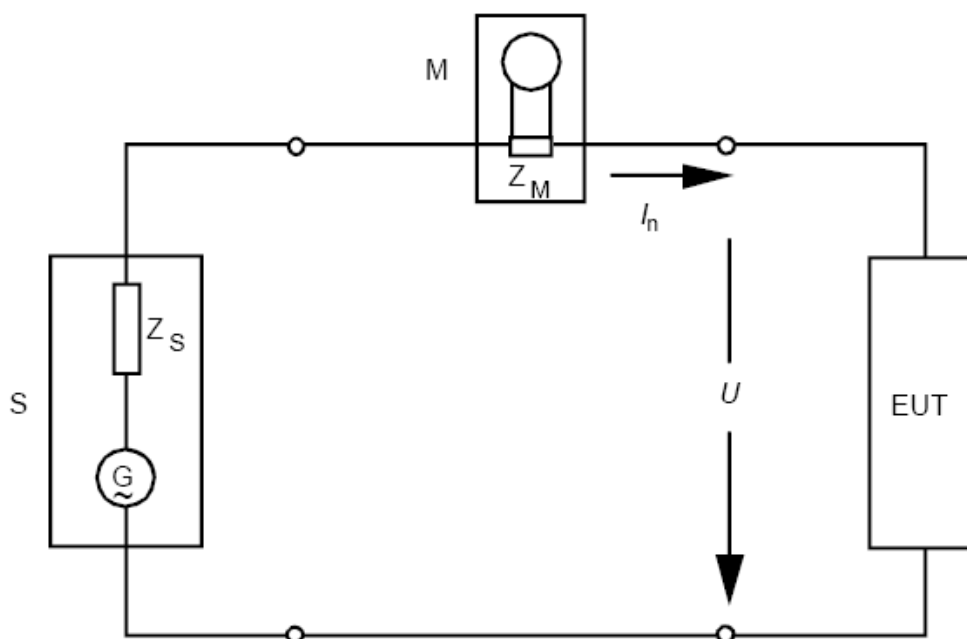
Test configuration and procedure see clause 7.1 of standard EN 61000-3-2: 2006+A2:2009.

5.3.3 Description of the test set-up

5.3.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.3.3.2 Block Diagram of Test Setup



5.3.4 Test result

The requirements are **Fulfilled**.

Remarks: The limits are kept. For detailed results, please see the following page(s).

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5.3.5 Test protocol

Operation mode	Normal	Result:	<input checked="" type="checkbox"/> - passed <input type="checkbox"/> - not passed
Remarks:			
Standard used:	EN 61000-3-2 Quasi-Stationary – Equipment class A		
Observation time:	10 min		
Windows width:	10 periods – (EN/IEC 61000-4-7 Edition 2002)		
Mains supply voltage:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX		
Ambient Temperature:	24°C		
Humidity:	56%		
Barometric Pressure:	86~106KPa		
E. U. T.:	Remote control quadcopter		
M/N:	S18C		
Date of test:	27 May 2015		
Tester:	Duke		
Test result			
E. U. T.:	PASS		
Power Source:	PASS		

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	Order (n): None
Harmonic(s) with average > 150%:	Order (n): None

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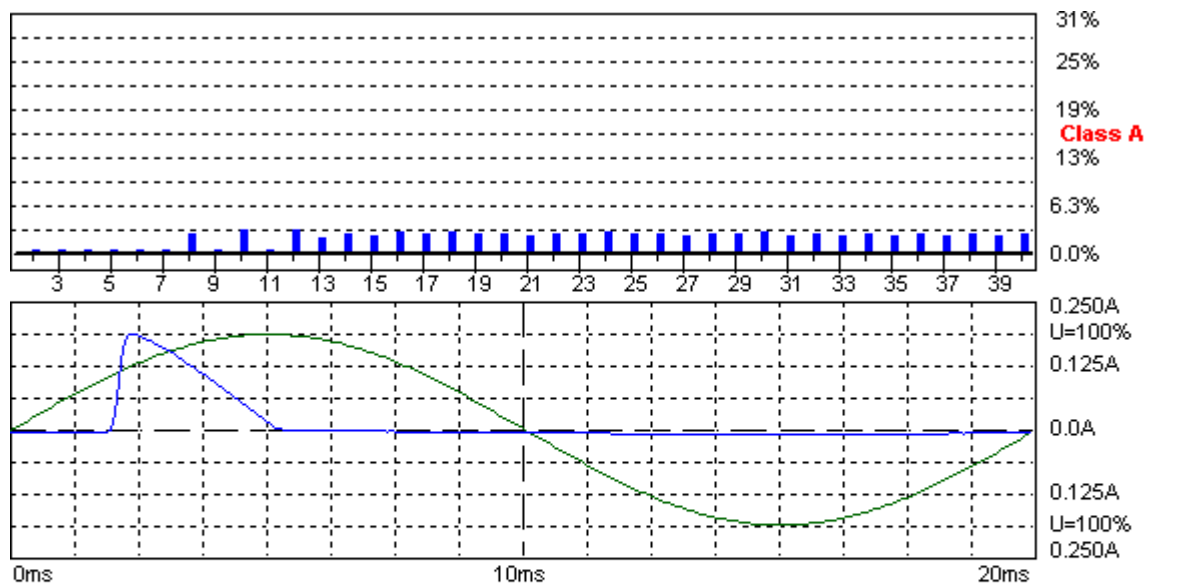
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Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

2015-5-27 17:08:35

Urms = 229.7 V P = 5.178 W THD(I) = 154 % Range: 0.25 A
 Irms = 0.048 A pf = 0.466 H1 (I) = 0.026 A V-nom: 230 V
 TestTime: 10 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Parber

Order	Freq. [Hz]	Irms [A]	Imax [A]	Limit [A]	Status	Remark
1	50	0.0259	0.0265	1.0800		
2	100	0.0222	0.0226	1.0800		
3	150	0.0193	0.0196	2.3000		
4	200	0.0158	0.0159	0.4300		
5	250	0.0121	0.0122	1.1400		
6	300	0.0087	0.0088	0.3000		
7	350	0.0062	0.0063	0.7700		
8	400	0.0051	0.0051	0.2300		
9	450	0.0049	0.0050	0.4000		
10	500	0.0049	0.0050	0.1840		
11	550	0.0047	0.0047	0.3300		
12	600	0.0041	0.0041	0.1533		
13	650	0.0035	0.0035	0.2100		
14	700	0.0030	0.0030	0.1314		
15	750	0.0028	0.0029	0.1500		
16	800	0.0028	0.0029	0.1150		
17	850	0.0027	0.0028	0.1324		
18	900	0.0026	0.0026	0.1022		
19	950	0.0024	0.0024	0.1184		
20	1000	0.0021	0.0021	0.0920		

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21	1050	0.0020	0.0020	0.1071		
22	1100	0.0019	0.0020	0.0836		
23	1150	0.0019	0.0020	0.0978		
24	1200	0.0019	0.0019	0.0767		
25	1250	0.0018	0.0018	0.0900		
26	1300	0.0016	0.0017	0.0708		
27	1350	0.0015	0.0016	0.0833		
28	1400	0.0015	0.0016	0.0657		
29	1450	0.0015	0.0015	0.0776		
30	1500	0.0015	0.0015	0.0613		
31	1550	0.0014	0.0014	0.0726		
32	1600	0.0013	0.0014	0.0575		
33	1650	0.0012	0.0013	0.0682		
34	1700	0.0012	0.0013	0.0541		
35	1750	0.0011	0.0012	0.0643		
36	1800	0.0011	0.0012	0.0511		
37	1850	0.0011	0.0012	0.0608		
38	1900	0.0011	0.0011	0.0484		
39	1950	0.0010	0.0011	0.0577		
40	2000	0.0010	0.0011	0.0460		

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5.4 Voltage fluctuations and flicker

For test instruments and accessories used see section 6 part 6.4.

5.4.1 Description of the test location

Test location : Test location no. 1

5.4.2 Limits of voltage fluctuation and flicker

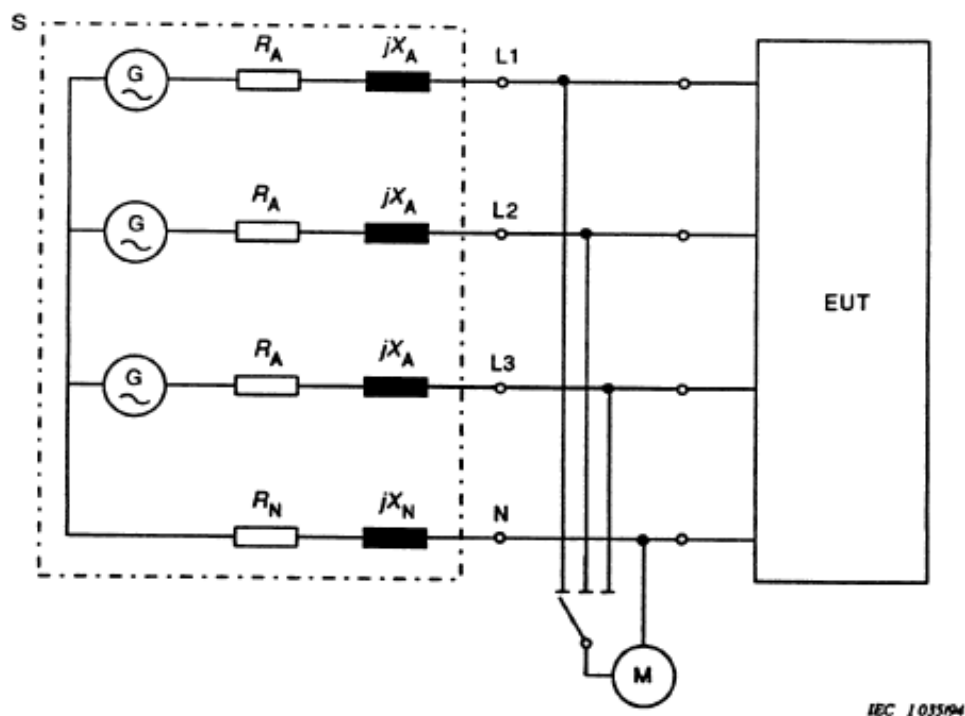
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013

5.4.3 Description of the test set-up

5.4.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emission are recorded

5.4.3.2 Block Diagram of Test Setup



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5.4.4 Test result

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

5.4.5 Test protocol

Operation mode	Normal	Result:	<input checked="" type="checkbox"/> - passed
Remarks:			<input type="checkbox"/> - not passed

Standard used:	EN 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Ambient Temperature:	24°C
Humidity:	56%
Barometric Pressure:	86~106KPa
E. U. T.:	Remote control quadcopter
M/N:	S18C
Date of test:	27 May 2015
Tester:	Duke

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.07	1.00	PASS
dc [%]	0.00	3.30	PASS
dmax [%]	0.00	4.00	PASS
dt [s]	0.00	0.50	PASS

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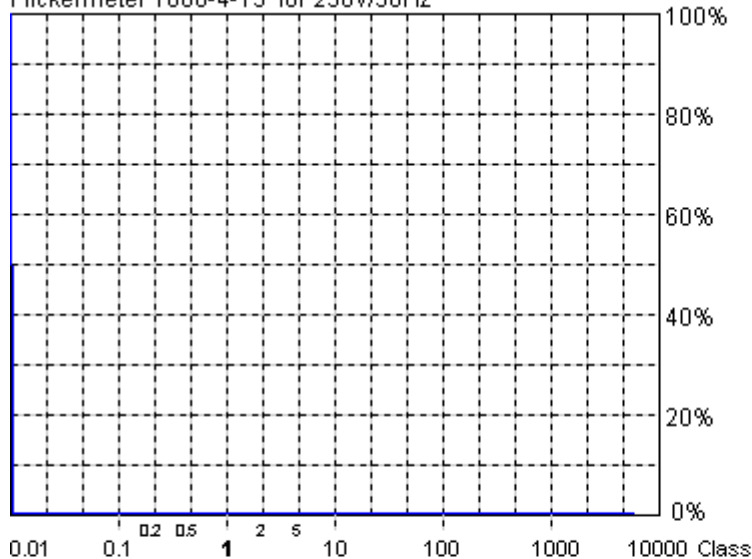
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Flickermeter 1000-4-15 for 230V/50Hz

**Flicker Emission - IEC 61000-3-3, EN 61000-3-3, (EN60555-3)**

Urms = 229.7 V P = 4.534 W
 Irms = 0.042 A pf = 0.465

2015-5-27 17:20:59

Range: 0.25 A
 V-nom: 230 V
 TestTime: 10 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Parber

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5.5 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.5.

5.5.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	21~28 May 2015
Operator :	Duke

5.5.2 Severity of levels electrostatic discharge

5.5.2.1 Severity level: Contact discharge at $\pm 4\text{KV}$ air discharge at $\pm 8\text{KV}$

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

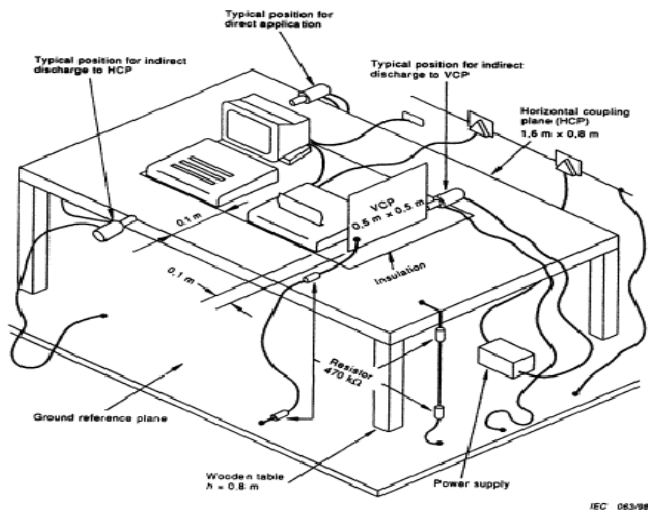
5.5.2.2 Performance criterion: B

5.5.3 Description of the test set-up

5.5.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.5.3.2 Block Diagram of Test Setup



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5.5.4 Test specification:

Contact discharge voltage:	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV
Air discharge voltage:	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV <input checked="" type="checkbox"/> 8 kV
Discharge impedance:	<input checked="" type="checkbox"/> 330 Ω / 150 pF	
Discharge factor:	<input checked="" type="checkbox"/> ≥ 1 sec.	
Number of discharges:	<input checked="" type="checkbox"/> ≥ 10	
Type of discharge:	Direct discharge	<input checked="" type="checkbox"/> Air discharge
		<input checked="" type="checkbox"/> Contact discharge
	Indirect discharge	<input checked="" type="checkbox"/> Contact discharge
Polarity:	<input checked="" type="checkbox"/> Positive	<input checked="" type="checkbox"/> Negative
Discharge location:	<input checked="" type="checkbox"/> see photo documentation of the test set-up	
	<input checked="" type="checkbox"/> all external locations accessible by hand	
	<input checked="" type="checkbox"/> horizontal plate (HCP)	
	<input checked="" type="checkbox"/> vertical coupling plate (VCP)	

5.5.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

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5.6 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.6.

5.6.1 Description of the test location

Test location :	GTEM chamber
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	21~28 May 2015
Operator :	Duke

5.6.2 Severity levels of radiated, Radio-frequency, electromagnetic field

5.6.2.1 Severity level: 3V/m

Level	Field strenght(V/m)
1	1
2	3
3	10
X	Special

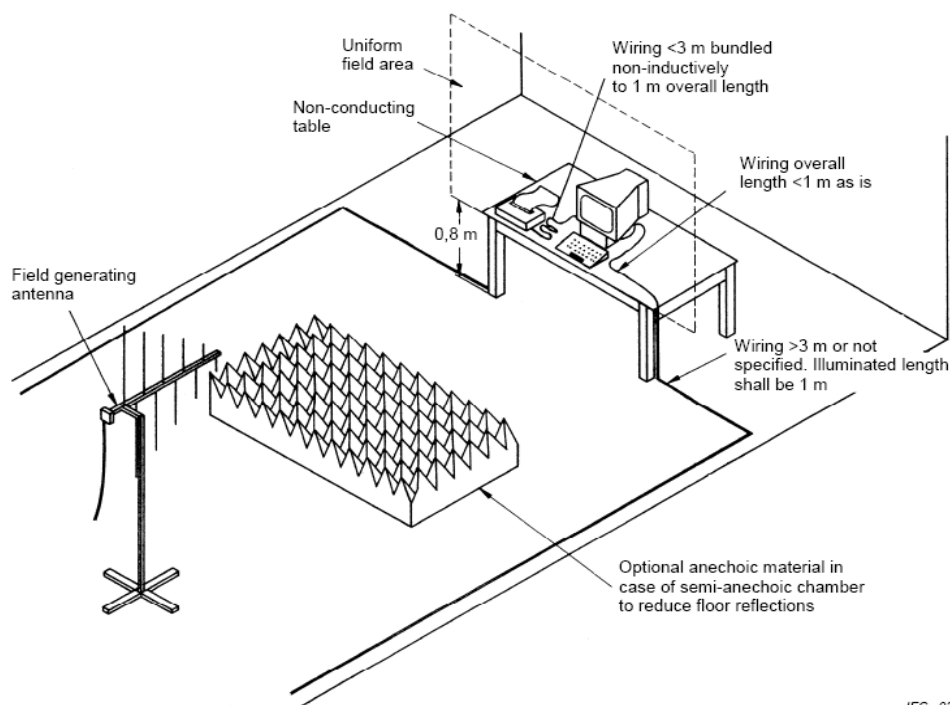
5.6.2.2 Performance criterion: A

5.6.3 Description of the test set-up

5.6.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.6.3.2 Block Diagram of Test Setup



IEC 034/06

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5.6.4 Test specification:

Frequency range:	<input checked="" type="checkbox"/> 80 MHz to 1000 MHz
	<input checked="" type="checkbox"/> 1400MHz to 2700 MHz
Field strength:	<input checked="" type="checkbox"/> 3 V/m
EUT - antenna separation:	<input checked="" type="checkbox"/> 3 m
Modulation:	<input checked="" type="checkbox"/> AM: 80 %
	<input checked="" type="checkbox"/> sinusoidal 1000Hz
Frequency step:	<input checked="" type="checkbox"/> 1 % with 3 s dwell time
Antenna polarisation:	<input checked="" type="checkbox"/> horizontal <input checked="" type="checkbox"/> vertical

5.6.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.7 Electrical fast transients / Burst

For test instruments and accessories used see section 6 part 6.7.

5.7.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	21~28 May 2015
Operator :	Duke

5.7.2 Severity levels of electrical fast transients / Burst

5.7.2.1 Severity level: $\pm 1000V$ for AC power supply lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak (KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1	0.5	5 or 100	0.25	5 or 100
2	1	5 or 100	0.5	5 or 100
3	2	5 or 100	1	5 or 100
4	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

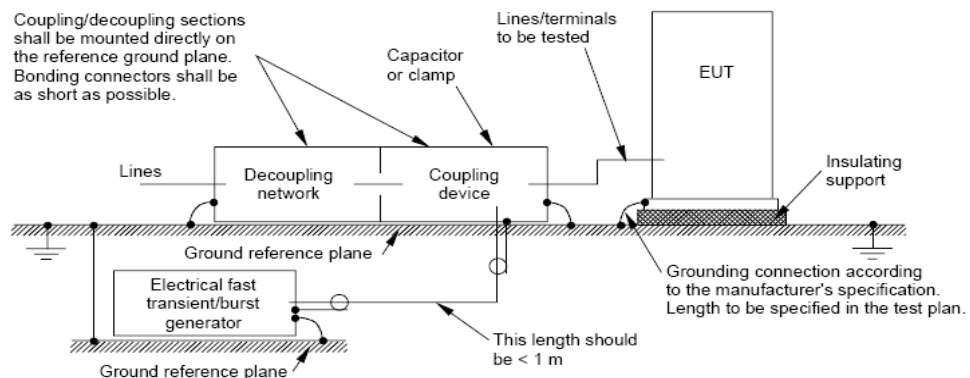
5.7.2.2 Performance criterion: B

5.7.3 Description of the test set-up

5.7.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.7.3.2 Block Diagram of Test Setup



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5.7.4 Test specification:

Coupling network:	<input checked="" type="checkbox"/> 0.5 kV	<input checked="" type="checkbox"/> 1 kV	<input type="checkbox"/> 2 kV
Coupling clamp:	<input type="checkbox"/> 0.5 kV	<input type="checkbox"/> 1 kV	
Burst frequency:	<input checked="" type="checkbox"/> 5.0 kHz		
Coupling duration:	<input checked="" type="checkbox"/> ≥ 60 s		
Polarity:	<input checked="" type="checkbox"/> positive	<input checked="" type="checkbox"/> negative	

5.7.5 Coupling points

Cable description:	AC power line: L, N, L+N
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

5.7.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

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5.8 Surge

For test instruments and accessories used see section 6 part 6.8.

5.8.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	21~28 May 2015
Operator :	Duke

5.8.2 Severity levels of surge

5.8.2.1 Severity level: Line to line: $\pm 1\text{KV}$ Line to earth: $\pm 2\text{KV}$

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

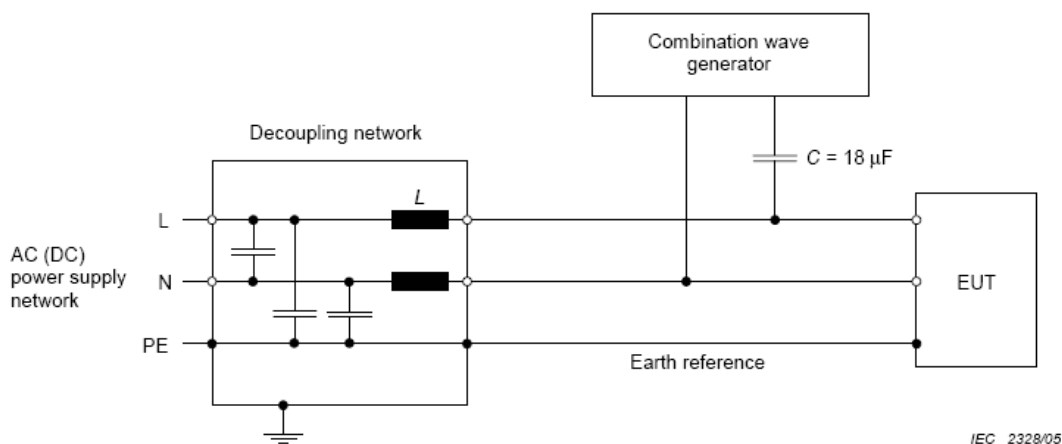
5.8.2.2 Performance Criterion: B

5.8.3 Description of the test set-up

5.8.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.8.3.2 Block Diagram of Test Setup



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5.8.4 Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 Ω + 18μF	<input checked="" type="checkbox"/> 0.5 kV <input checked="" type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input type="checkbox"/> 4 kV
Pulse amplitude-Power line unsym.: Source impedance: 12 Ω + 9μF	<input type="checkbox"/> 0.5 kV <input type="checkbox"/> 1 kV <input type="checkbox"/> 2 kV <input checked="" type="checkbox"/> 4 kV
Number of surges:	<input checked="" type="checkbox"/> 5 Surges/Phase angle
Phase angle:	<input checked="" type="checkbox"/> 0 ° <input checked="" type="checkbox"/> 90 ° <input checked="" type="checkbox"/> 180 ° <input checked="" type="checkbox"/> 270 °
Repetition rate:	<input checked="" type="checkbox"/> 60 s
Polarity:	<input checked="" type="checkbox"/> positive <input checked="" type="checkbox"/> negative

5.8.5 Coupling points

Cable description:	AC power line: L+N
Screening:	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive <input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue <input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> 1.5 m

5.8.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.9 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 6 part 6.9.

5.9.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity: 56%
Date of test :	21~28 May 2015
Operator :	Duke

5.9.2 Severity levels of conducted disturbances induced by radio-frequency fields discharge

5.9.2.1 Severity Level: 3V

Level	Field Strength (V)
1	1
2	3
3	10
X	Special

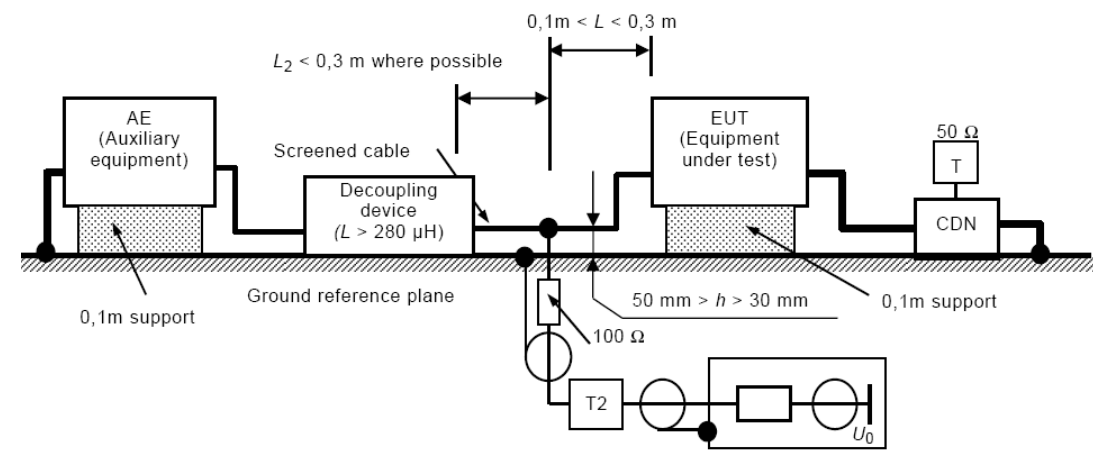
5.9.2.2 Performance Criterion: A

5.9.3 Description of the test set-up

5.9.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.9.3.2 Block Diagram of Test Setup



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5.9.4 Test specification:

Frequency range:	■ 0.15 MHz to 80 MHz
Test voltage:	■ 3 V
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time

5.9.5 Coupling points

Cable description (Port1):	AC power line: L+N
Screening:	<input type="checkbox"/> screened ■ unscreened
Status:	<input type="checkbox"/> passive ■ active
Signal transmission:	■ analogue <input type="checkbox"/> digital
Length:	■ 0.3 m

5.9.6 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.10 Voltage dips

For test instruments and accessories used see section 6 part 6.10.

5.10.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity: 56%
Date of test :	21~28 May 2015
Operator :	Duke

5.10.2 Severity levels of voltage dips

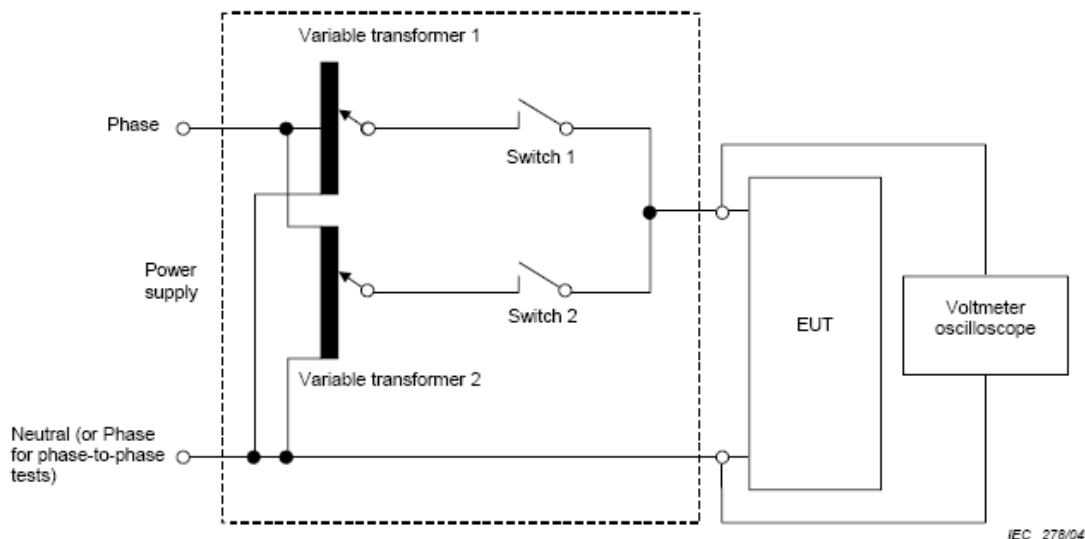
Test Level (%Ut)	Voltage Dips (%Ut)	Performance Criterion	Duration (in period)
0	100	B	0.5
0	100	B	1
70	30	C	25

5.10.3 Description of the test set-up

5.10.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.10.3.2 Block Diagram of Test Setup



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5.10.4 Test specification:

Nominal Mains Voltage (V _N):	■ AC 230V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 100 % / 10ms
Level of reduction(dip) / duration:	■ 100 % / 20ms
Level of reduction(dip) / duration:	■ 30 % / 500ms

5.10.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

5.11 Voltage Short interruptions

For test instruments and accessories used see section 6 part 6.11.

5.11.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 3.7V, AC 230V/50Hz for Charging Battery 1.5V*4 for TX
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	21~28 May 2015
Operator :	Duke

5.11.2 Severity levels of voltage short interruptions

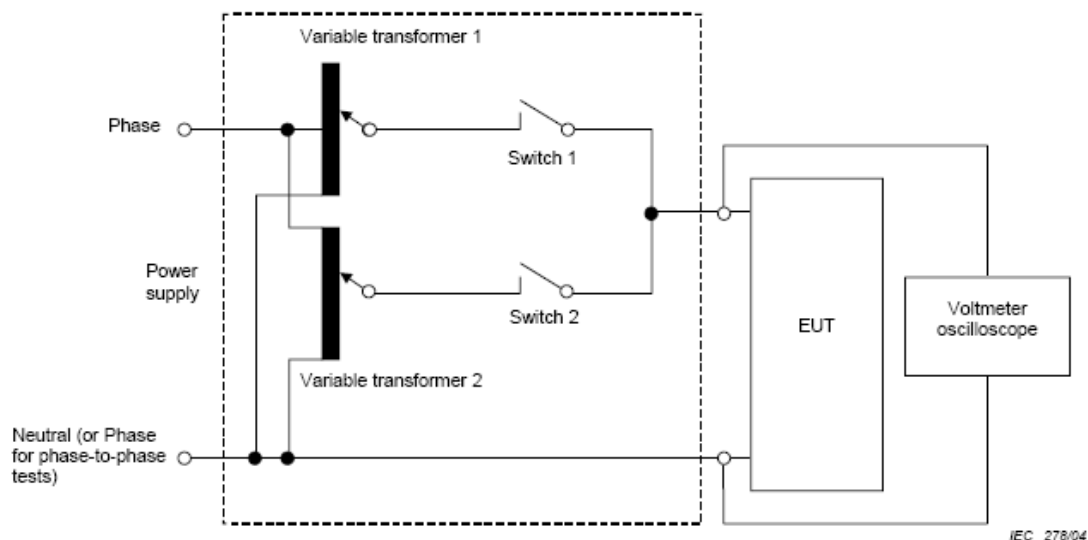
Test Level (%Ut)	Voltage Short Interruptions (%Ut)	Performance Criterion	Duration (in period)
0	100	C	250

5.11.3 Description of the test set-up

5.11.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.11.3.2 Block Diagram of Test Setup



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5.11.4 Test specification:

Nominal Mains Voltage (V _N):	■ AC 230 V
Number of voltage fluctuations:	■ 3
Level of reduction(dip) / duration:	■ 5000 ms

5.11.5 Test result

The requirements are **Fulfilled** Performance Criterion: **C**
Remarks: During the test no deviation was detected to the selected operation mode(s).

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6 USED TEST EQUIPMENT

6.1					
Radiated disturbance (Electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2015/03/24
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2014/11/04
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2015/03/24
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2015/03/24
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2015/03/24
6	Pre-Amplifier	EMC	EMC330	980113	2015/03/24
7	Pre-Amplifier	EMC	EMC012645	980114	2015/03/24
8	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2					
Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2014/11/04
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2014/11/04
3	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z6	100140	2014/11/04
4	Pulse Limiter	ROHDE & SCHWARZ	ESHS-Z2	100301	2014/11/04
5	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.3					
Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2014/11/04
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.4					
Voltage Fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	Harmonics1000-1P	103488	2014/11/04
2	Harmonics-1000	EMC Partner	N/A	N/A	N/A

6.5					
Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	0302016	2015/03/24

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6.6					
RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	SMY 01	843215/014	2014/11/04
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2014/11/04
3	Amplifier	KALMUS	713FC	7385-1	2014/11/04
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2014/11/04
5	Field Probe	ETS	HI-6005	00075047	2014/11/11
6	RS Test Software	Farad	EZ-RS	N/A	N/A

6.7					
Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2013/11/05
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.8					
Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	Coupling Clamp	EMC Partner	SFT 410	0302015	2013/11/05
4	Genecs Software	EMC Partner	N/A	N/A	N/A

6.9					
Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2014/11/04
2	CDN	Schlöder	CDN M3	A3003008	2014/11/04
3	CDN	Schlöder	CDN T2	A3010005	2014/11/04
4	Attenuator	Abschwächer	DC-500MHz	N/A	2014/11/04
5	EM injection clamp	Liithi	EM101	35670	2013/11/06
6	CDG-6000 Software	Schlöder	N/A	N/A	N/A

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6.10

Voltage Dips

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

6.11

Voltage Short Interruptions

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	Transient-1000	HAR1000-78	2014/11/04
2	3-Phase Coupling Network	EMC Partner	CDN1000	CDN1000-08	2014/11/04
3	GenecsSoftware	EMC Partner	N/A	N/A	N/A

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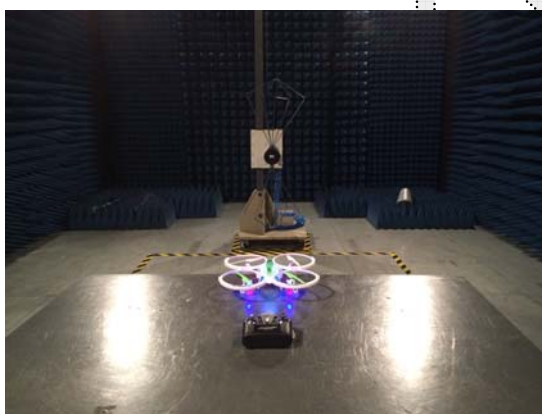
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7 TEST PHOTOGRAPHS

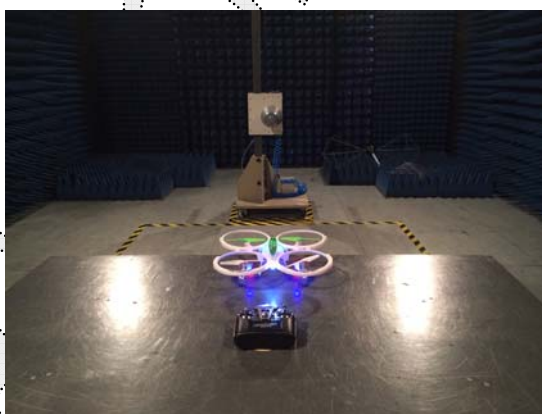
7.1. Photo of power line conducted emission measurement (C.E.)



7.2. Photo of radiated emission measurement (R.E. Electric field)



RE below 1G



RE above 1G

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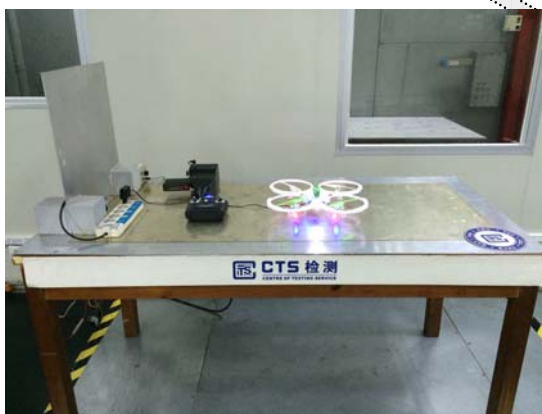
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7.3. Photo of harmonic current and flicker emission measurement (H.&F.)**7.4. Photo of electrostatic discharge Immunity measurement (E.S.D.)****7.5. Photo of RF field strength Immunity measurement (R.S.)**

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7.6. Photo of EFT/surge/Dips immunity measurement (E.F.T./Surge./Dips.)**7.7. Photo of conducted disturbance Immunity measurement (C.S.)**

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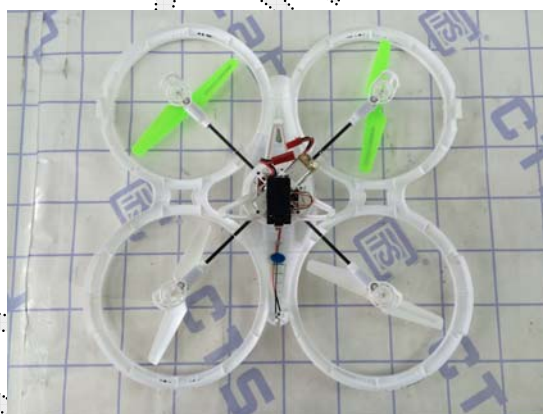
8 External and Internal Photos of the EUT



External view



RX External view 1



RX External view 2

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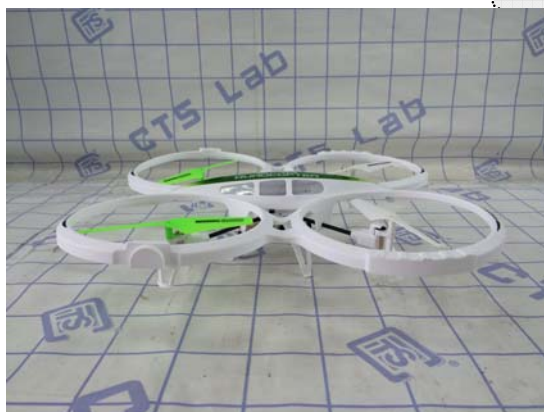
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RX External view 3



RX External view 4



RX External view 5

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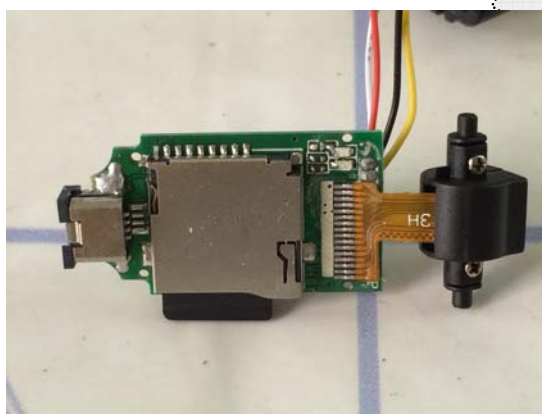
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RX External view 6



RX PCB 1 view 1



RX PCB 1 view 2

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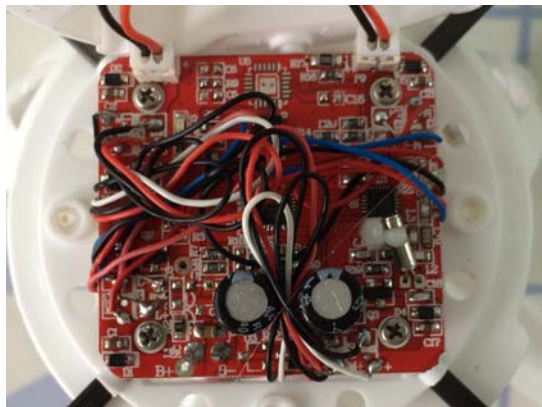
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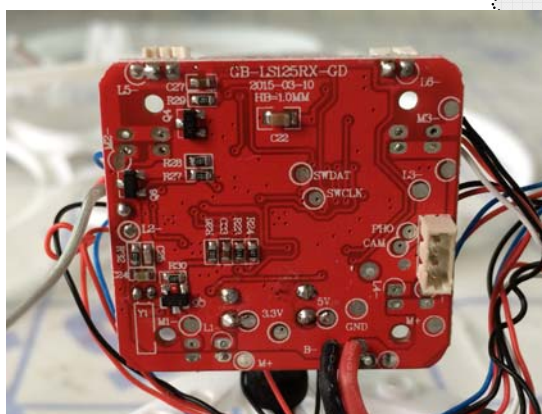
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RX PCB 2 view 1



RX PCB 2 view 2



TX External view 1

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TX External view 3



TX External view 4

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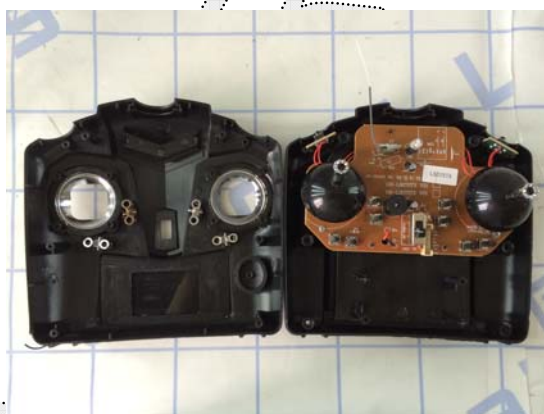
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TX External view 5



TX External view 6



TX Internal view

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CTS (Ningbo) Testing Service Technology Co., Ltd.

2/F., South Tower, Huoju Building, No.181, Canghai Road, Jiangdong Science and Technology Park, Ningbo, Zhejiang, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

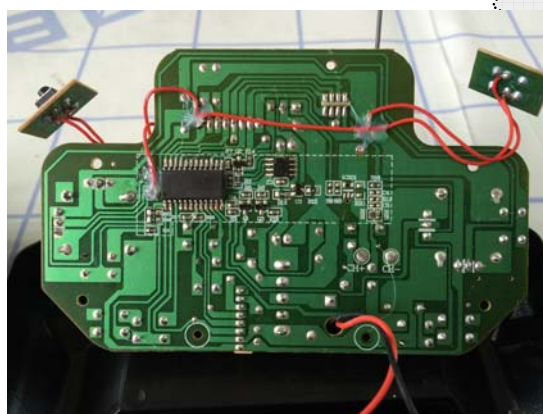
Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

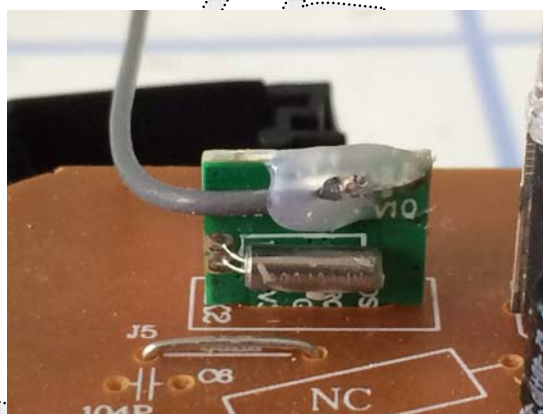
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TX PCB 1 view 1



TX PCB 1 view 2



Module view 1

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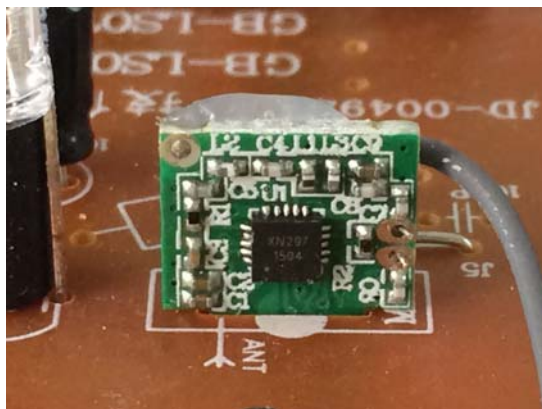
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Module view 2



Battery view

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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

W300L, W301, W302, W303, W304, W305, W306,
W307, W308, W309, W310, W311, W312, W313,
W314, S17, S19, S20, S21, S22, S23,
S24, S25, W400, W401, W402, W403, W404,
W405, W406, W407, W408, W409, S900, S901,
S902, S903, S904, S905, S906, S907, S908

Belong to the tested device:

Product description: **Remote control quadcopter**
Model name: **S18C**

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