



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

**OPERATE ACCORDING TO ISO/IEC 17025**

# **RF TEST REPORT**

**TEST REPORT NUMBER : CGZ3150521-00577-ER**



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

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

<b>TEST REPORT</b> <b>ETSI EN 300 440-1 V 1.6.1, ETSI EN 300 440-2 V 1.4.1</b> Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Device (SRD); Radio equipment to be used in the 1GHz to 40GHz frequency range; Part 1: Technical Characteristics and test methods Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 1GHz to 40GHz frequency range; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive	
<b>Report Reference No.</b>	CGZ3150521-00577-ER
<b>Date of issue</b>	29 May 2015
<b>Testing Laboratory Name</b>	<b>CTS (Ningbo) Testing Service Technology Co., Ltd.</b>
<b>Address</b>	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China
<b>Testing location/ procedure</b>	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
<b>Applicant's name</b>	X-HONG INTERNATIONAL GROUP CO., LTD.
<b>Address</b>	1502 / UNIT 02, 15/F, RICKY CENTRE, NO. 36 CHONG YIP STREET, KWUN TONG, KOWLOON, HONGKONG
<b>Test specification:</b> Standard ..... <b>ETSI EN 300 440-1 V 1.6.1, ETSI EN 300 440-2 V 1.4.1</b> <b>EN 62479:2010</b> 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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<b>Test item description.</b> ..... Remote control quadcopter Trade Mark ..... / Manufacturer ..... X-HONG INTERNATIONAL GROUP CO., LTD. Model/Type reference ..... S18C Ratings/Frequency ..... Battery 3.7V, AC 230V/50Hz for Charging By adapter Battery 1.5V*4 for TX Result ..... <b>PASSED</b>	

Compiled by:

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## RF -- TEST REPORT

**Test Report No. : CGZ3150521-00577-ER**

 29 May 2015  
 Date of issue

Type / Model..... S18C

EUT..... Remote control quadcopter

**Applicant**..... X-HONG INTERNATIONAL GROUP CO., LTD.

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The test report merely corresponds to the test sample.

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## 1 TEST STANDARDS

The tests were performed according to following standards:

**ETSI EN 300 440-1 V 1.6.1**

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Device (SRD); Radio equipment to be used in the 1GHz to 40GHz frequency range; Part 1: Technical Characteristics and test methods

**ETSI EN 300 440-2 V 1.4.1**

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 1GHz to 40GHz frequency range; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

**EN 62479:2010**

Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

## 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 RF requirements pertaining to the technical standards and tested operation modes are

☒ - fulfilled.

☐ - **not** fulfilled.

The equipment under test

☒ - fulfils the RF requirements cited on page 1.

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

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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  
Frequency band: 2.405~2.475GHz (ISM Band)

#### 3.3 EUT operation mode

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

- ☒ – 2405MHz Low Channel
- ☒ – 2445MHz Middle Channel
- ☒ – 2475MHz High Channel

**Operating Mode:** TX and RX

Emissions tests.....: According to **ETSI EN 300 440-1 V 1.6.1, ETSI EN 300 440-2 V 1.4.1**  
searching for the highest disturbance.

#### 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

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

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

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### 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.

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#### 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.

Radio frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1,5$ dB
Maximum frequency deviation:	
- within 300 Hz and 6 kHz of audio frequency	$\pm 5$ %
- within 6 kHz and 25 kHz of audio frequency	$\pm 3$ dB
Adjacent channel power	$\pm 3$ dB
Conducted spurious emission of transmitter, valid up to 6 GHz	$\pm 3$ dB
Conducted emission of receivers	$\pm 3$ dB
Radiated emission of transmitter, valid up to 6 GHz	$\pm 6$ dB
Radiated emission of receiver, valid up to 6 GHz	$\pm 6$ dB
RF level uncertainty for a given BER	$\pm 1,5$ dB
Temperature	$\pm 1$ °C
Humidity	$\pm 10$ %

#### 4.6 Test Description and Results

Test case	Subclause	Results
<b>TRANSMITTER PARAMETERS</b>		
Equivalent isotropically radiated power (e.i.r.p.)	7.1.3	PASS
Permitted range of operating frequencies	7.2.4	PASS
Unwanted emissions in the spurious domain	7.3.6	PASS
Duty Cycle	7.4.3	PASS
Adjacent channel selectivity	8.1.3	PASS
Blocking or desensitization	8.2.3	PASS
Receiver spurious emissions	8.3.5	PASS

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## 5 TEST CONDITIONS AND RESULTS

### 5.1 Equivalent isotropically radiated power (e.i.r.p.)

#### 5.1.1 LIMIT

##### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.1.3

The transmitter maximum e.i.r.p. under normal and extreme test conditions shall not exceed the values given in table 4.

Table 4: Maximum radiated peak power (e.i.r.p.)

Frequency Bands	Power	Application	Notes
2 400 MHz to 2 483,5 MHz	10 mW e.i.r.p.	Generic use	
2 400 MHz to 2 483,5 MHz	25 mW e.i.r.p.	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	500 mW e.i.r.p.	RFID	See also table 6 and annex C
(b) 2 446 MHz to 2 454 MHz	4 W e.i.r.p.	RFID	See also table 6 and annex C
5 725 MHz to 5 875 MHz	25 mW e.i.r.p.	Generic use	
9 200 MHz to 9 500 MHz	25 mW e.i.r.p.	Radiodetermination: radar, detection, movement and alert applications	
9 500 MHz to 9 975 MHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
10,5 GHz to 10,6 GHz	500 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
13,4 GHz to 14,0 GHz	25 mW e.i.r.p.	Radiodetermination: Radar, detection, movement and alert applications	
17,1 GHz to 17,3 GHz	400 mW e.i.r.p.	Radiodetermination: GBSAR detection, movement and alert applications	See annex E
24,00 GHz to 24,25 GHz	100 mW e.i.r.p.	Generic use and Radiodetermination: radar, detection, movement and alert applications	

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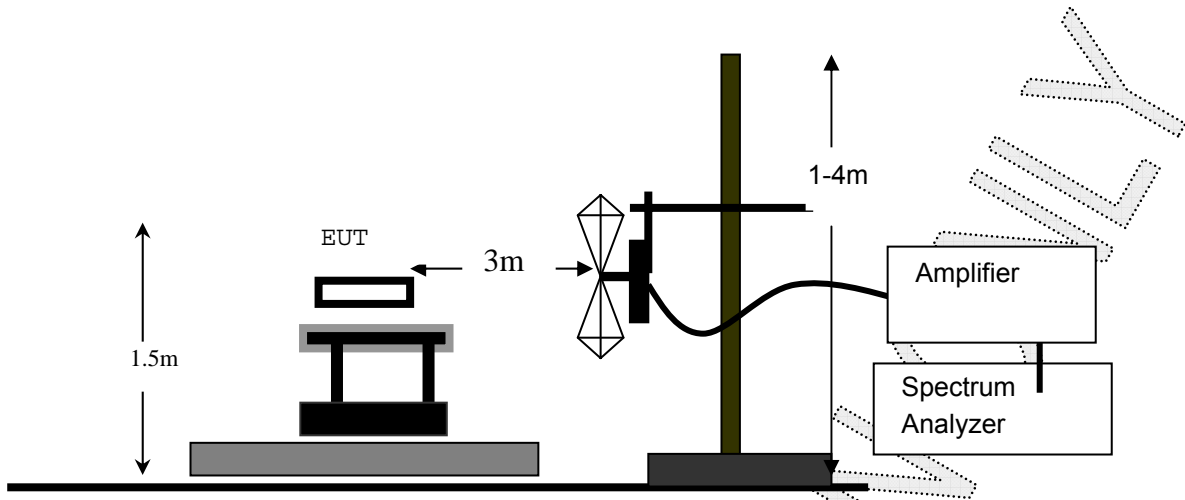
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5.1.2 TEST CONFIGURATION



5.1.3 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 5.1 for the test conditions.  
Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.1.2 for the measurement method.

5.1.4 TEST RESULTS

Channel	Freq.	Antenna	Results	Limit
	(MHz)	Polarity	(dBm)	(dBm)
Low	2405	V	-2.15	10
	2405	H	-5.62	
Middle	2445	V	-2.11	10
	2445	H	-5.37	
High	2475	V	-2.18	10
	2475	H	-5.59	

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## 5.2 Permitted range of operating frequencies

### 5.2.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.2.4

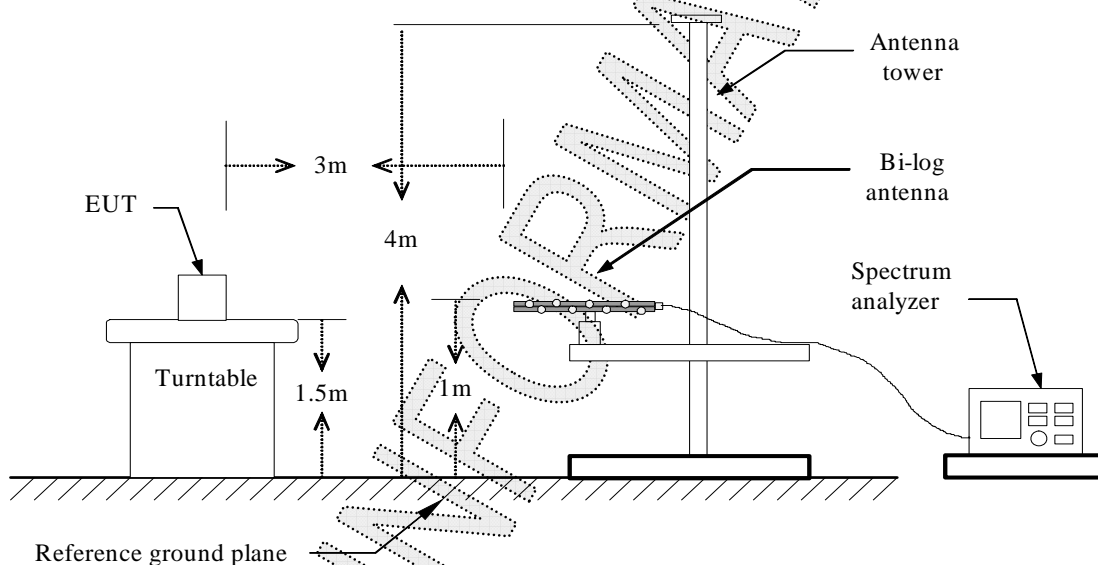
The width of the power spectrum envelope is  $f_H - f_L$  for a given operating frequency. In equipment that allows adjustment or selection of different operating frequencies, the power envelope takes up different positions in the allowed band. The frequency range is determined by the lowest value of  $f_L$  and the highest value of  $f_H$  resulting from the adjustment of the equipment to the lowest and highest operating frequencies.

The occupied bandwidth (i.e. the bandwidth in which 99 % of the wanted emission is contained) and the necessary bandwidth of the transmitter shall fall within the assigned frequency band. For all equipment the frequency range shall lie within the frequency band given by clause 7.1.3, table 4.

For non-harmonized frequency bands the available frequency range may differ between national administrations.

### 5.2.2 TEST CONFIGURATION

#### Below 1GHz



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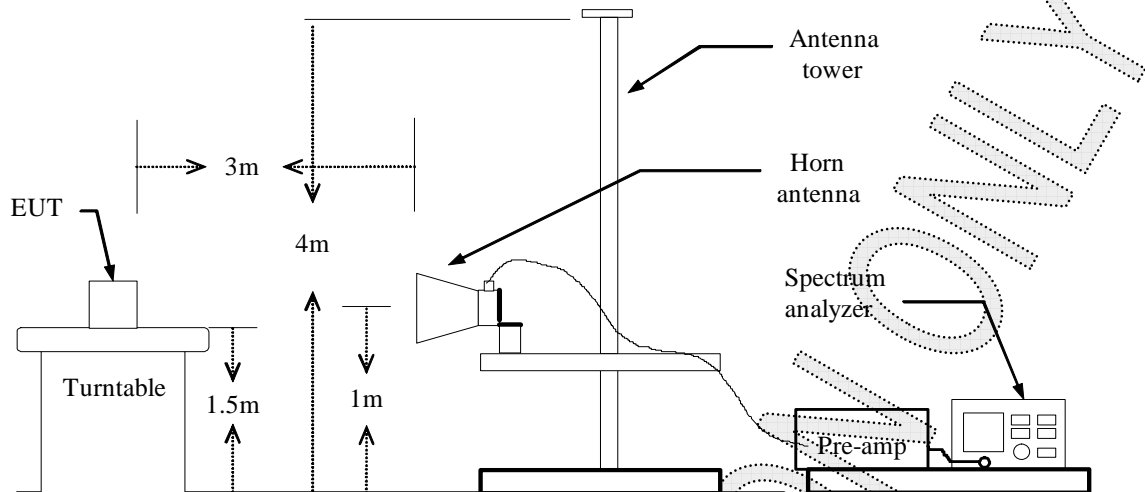
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## Above 1GHz



### 5.2.3 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 5.1 for the test conditions.
2. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.2.2/7.2.3 for the measurement method.

### 5.2.4 TEST RESULTS

TEST CONDITION			Frequency Range	
			Low Frequency	High Frequency
Temperature	Voltage		MHz	MHz
25°C	Vnor	6.00	2405.027	2475.019
-20°C	Vmin	5.40	2405.034	2475.011
	Vmax	6.60	2405.033	2475.021
55°C	Vmin	5.40	2405.032	2475.032
	Vmax	6.60	2405.041	2475.017
Measured frequencies (lowest and Highest)			2405.041	2475.032
Limit			FL > 2400MHz	FH < 2483.5MHz

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## 5.3 Unwanted emissions in the spurious domain

### 5.3.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.3.6

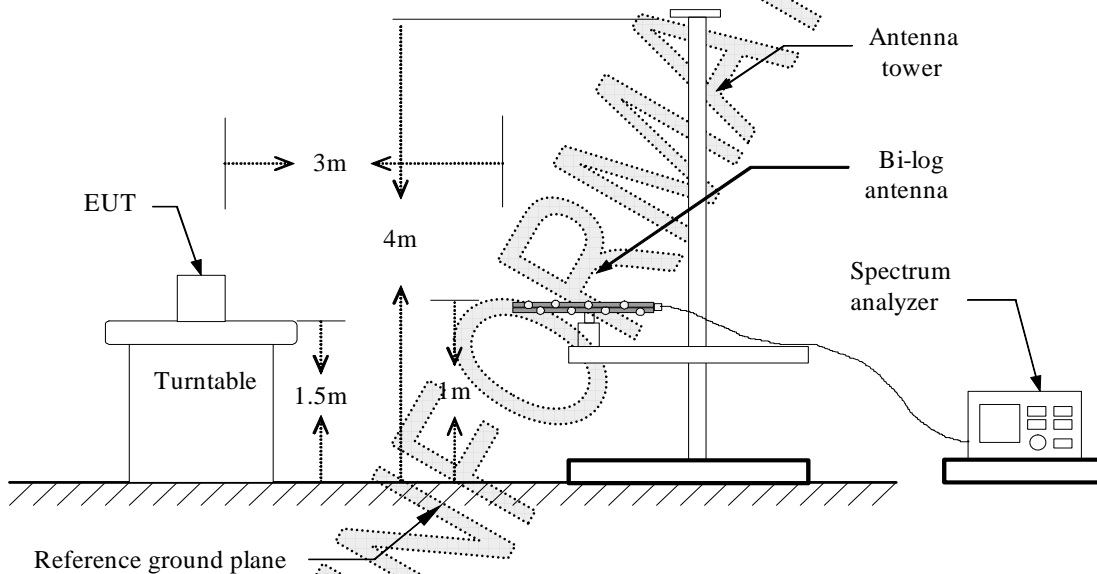
The power of any spurious emission shall not exceed the following values given in table 5.

Table 5: Spurious emissions

Frequency ranges	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies $\leq 1\,000$ MHz	Frequencies $> 1\,000$ MHz
State			
Operating	4 nW	250 nW	1 $\mu$ W
Standby	2 nW	2 nW	20 nW

### 5.3.2 TEST CONFIGURATION

#### Below 1GHz



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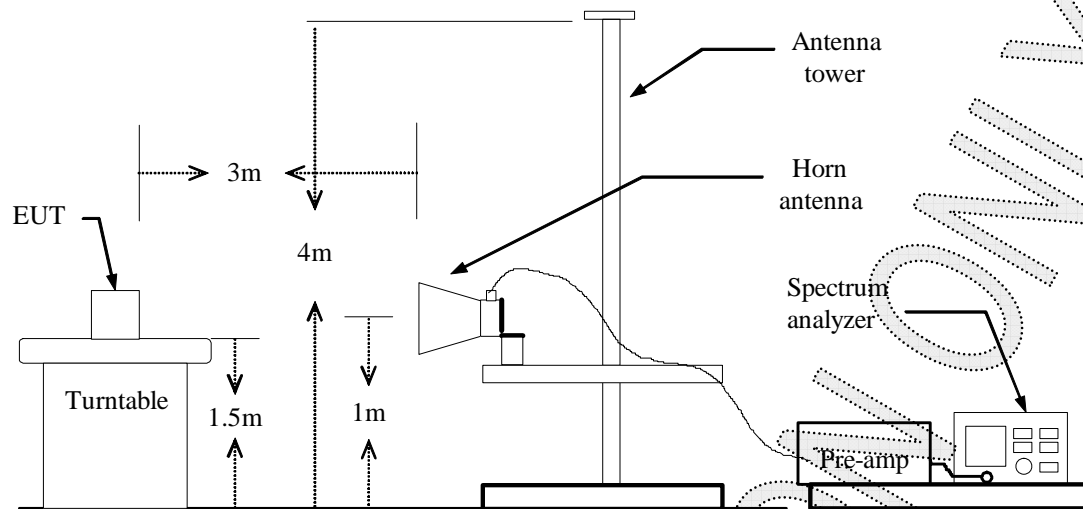
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## Above 1GHz



### 5.3.3 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 5.1 for the test conditions.
2. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.3.2/7.3.3/7.3.4 for the measurement method.

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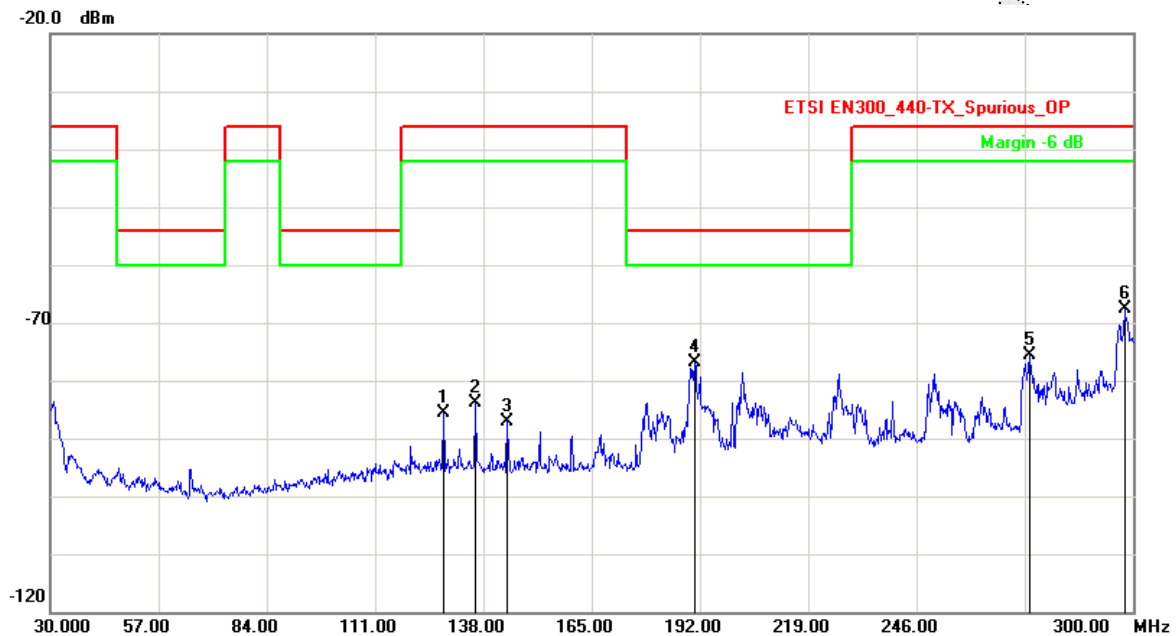
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## 5.3.4 TEST RESULTS

Channel:	TX	Result:	■ - passed
Test point:	Horizontal		□ - not passed
Frequency range:	30MHz~1GHz		



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	128.0100	-16.26	-69.28	-85.54	-36.00	-49.54	peak
2	136.1100	-16.09	-67.90	-83.99	-36.00	-47.99	peak
3	143.9400	-16.01	-71.09	-87.10	-36.00	-51.10	peak
4	190.6500	-14.24	-62.61	-76.85	-54.00	-22.85	peak
5	274.0800	-8.90	-66.84	-75.74	-36.00	-39.74	peak
6	297.8400	-1.99	-65.62	-67.61	-36.00	-31.61	peak

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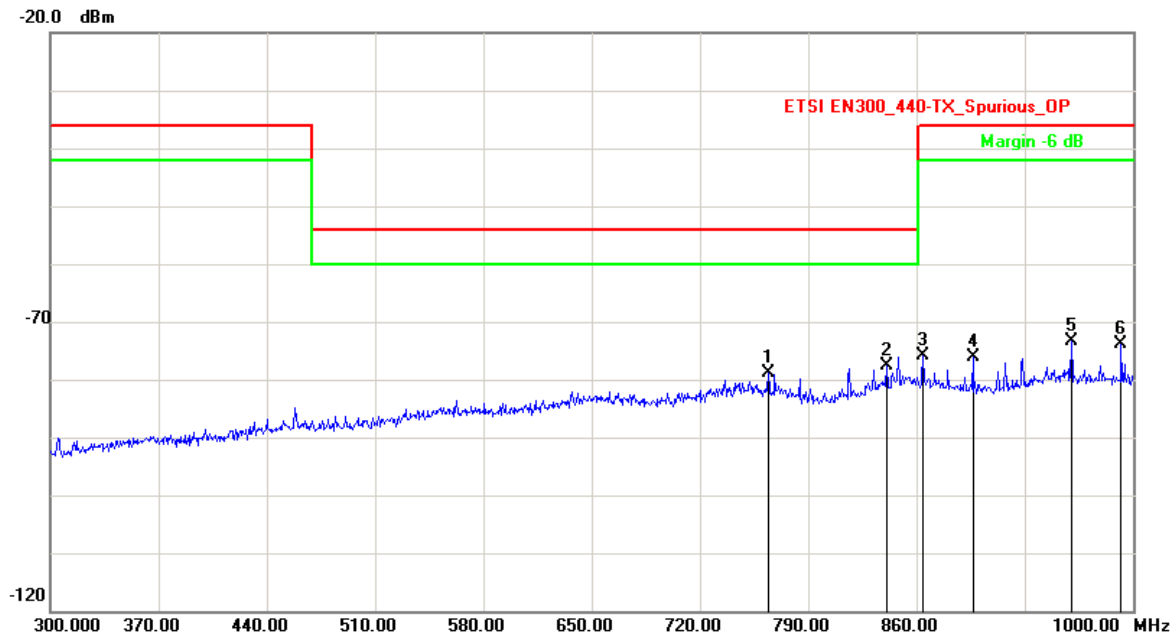
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	764.1000	-2.07	-76.87	-78.94	-54.00	-24.94	peak
2	841.1000	-0.82	-76.72	-77.54	-54.00	-23.54	peak
3	864.2000	-0.72	-75.17	-75.89	-36.00	-39.89	peak
4	896.4000	-1.68	-74.47	-76.15	-36.00	-40.15	peak
5	960.1000	0.33	-73.72	-73.39	-36.00	-37.39	peak
6	992.3000	0.02	-73.95	-73.93	-36.00	-37.93	peak

Channel:	Low Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	3425.351	-1.90	-71.50	-73.40	-30.00	-43.40	peak
2	5309.118	4.19	-70.72	-66.53	-30.00	-36.53	peak

Channel:	High Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	4249.499	0.70	-70.86	-70.16	-30.00	-40.16	peak
2	6627.756	7.78	-66.68	-58.90	-30.00	-28.90	peak

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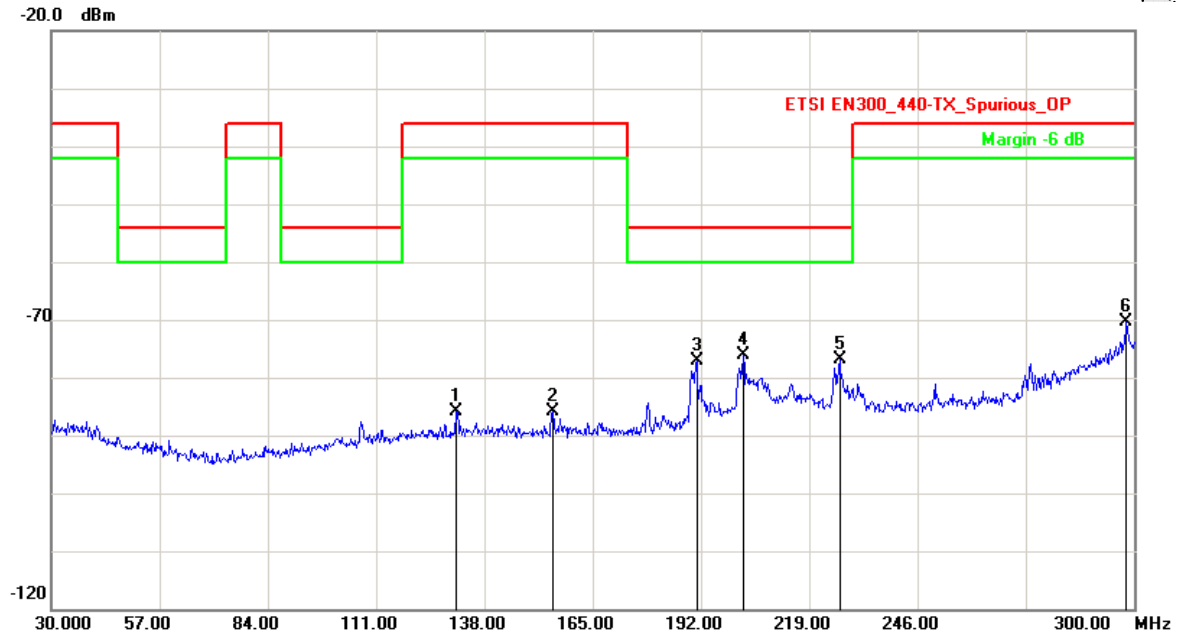
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Channel:	TX	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	30MHz~1GHz		



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	130.9800	-16.13	-69.84	-85.97	-36.00	-49.97	peak
2	155.0100	-15.97	-69.84	-85.81	-36.00	-49.81	peak
3	190.9200	-14.19	-62.87	-77.06	-54.00	-23.06	peak
4	202.5300	-11.75	-64.39	-76.14	-54.00	-22.14	peak
5	226.5600	-11.40	-65.50	-76.90	-54.00	-22.90	peak
6	298.1100	-1.92	-68.51	-70.43	-36.00	-34.43	peak

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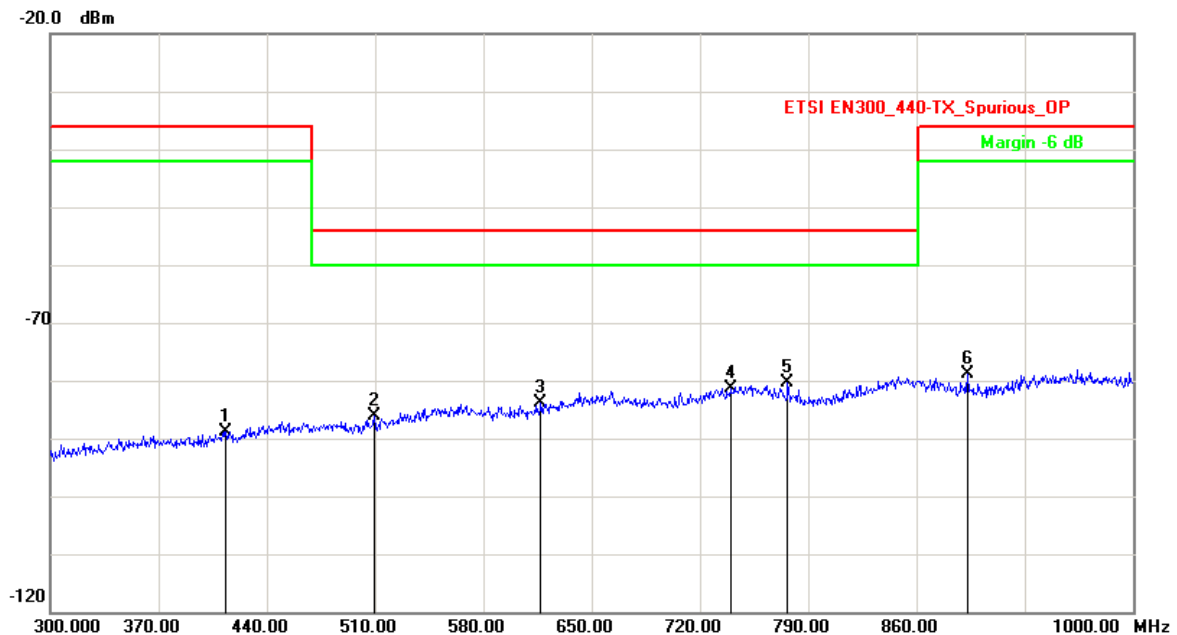
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	413.4000	-9.96	-78.81	-88.77	-36.00	-52.77	peak
2	509.3000	-7.67	-78.54	-86.21	-54.00	-32.21	peak
3	617.1000	-4.76	-79.16	-83.92	-54.00	-29.92	peak
4	739.6000	-2.04	-79.34	-81.38	-54.00	-27.38	peak
5	776.7000	-2.49	-77.94	-80.43	-54.00	-26.43	peak
6	892.9000	-1.58	-77.29	-78.87	-36.00	-42.87	peak

Channel:	Low Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	3660.822	-1.16	-71.09	-72.25	-30.00	-42.25	peak
2	7546.092	10.39	-72.21	-61.82	-30.00	-31.82	peak

Channel:	High Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	4061.122	0.01	-70.49	-70.48	-30.00	-40.48	peak
2	5874.249	6.14	-67.80	-61.66	-30.00	-31.66	peak

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

**Note: Others frequency test level margin all >6dB**

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## 5.4 Duty Cycle

### 5.4.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 7.4.3

In a period of 1 hour the duty cycle shall not exceed the values given in table 6.

Table 6: Duty cycle limits

Frequency Band	Duty cycle	Application	Notes
2 400 MHz to 2 483,5 MHz	No Restriction	Generic use	
2 400 MHz to 2 483,5 MHz	No Restriction	Detection, movement and alert applications	
(a) 2 446 MHz to 2 454 MHz	No Restriction	RFID	See annex C
(b) 2 446 MHz to 2 454 MHz	≤ 15 %	RFID	See annex C
5 725 MHz to 5 875 MHz	No Restriction	Generic use	
9 200 MHz to 9 500 MHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
9 500 MHz to 9 975 MHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
10,5 GHz to 10,6 GHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
13,4 GHz to 14,0 GHz	No Restriction	Radiodetermination: radar, detection, movement and alert applications	
17,1 GHz to 17,3 GHz	DAA or equivalent techniques	Radiodetermination: GBSAR detecting and movement and alert applications	See annex E
24,00 GHz to 24,25 GHz	No Restriction	Generic use and for Radiodetermination: radar, detection, movement and alert applications	

### 5.4.2 TEST PROCEDURE

Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 6.1.1 / 6.1.2 for the test conditions.

### 5.4.3 TEST RESULTS

The duty cycle limits is no restriction.

**Conclusion: PASS**

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## 5.5 Adjacent channel selectivity

### 5.5.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.1.3

The adjacent channel selectivity of the equipment under specified conditions shall not be less than the levels of the unwanted signal as stated in table 7.

Table 7: Limit for adjacent channel selectivity

Receiver category	Limit
1	-30 dBm + k
2	No limit
3	No limit

The correction factor,  $k$ , is as follows:

$$k = -20 \log f - 10 \log BW$$

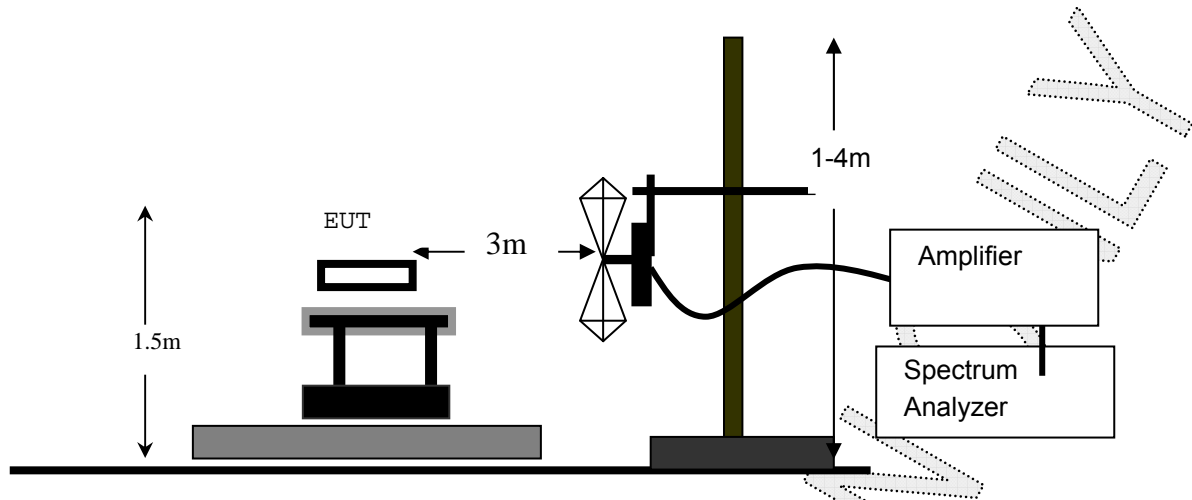
Where:

- $f$  is the frequency in GHz;
- $BW$  is the channel bandwidth in MHz.

The factor  $k$  is limited within the following:

- $0 < k < 40$  dB.

### 5.5.2 TEST CONFIGURATION



### 5.5.3 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 6.1 for the test conditions.
2. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.1.2 for the measurement method.

### 5.5.4 TEST RESULTS

The adjacent channel selectivity level of the equipment is too low to the limit.

**Conclusion: PASS**

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## 5.6 Blocking or desensitization

### 5.6.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.2.3

The blocking level, for any frequency within the specified ranges, shall not be less than the values given in table 8, except at frequencies on which spurious responses are found.

Table 8: Limits for blocking or desensitization

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	No limit

The correction factor,  $k$ , is as follows:

$$k = -20 \log f - 10 \log BW$$

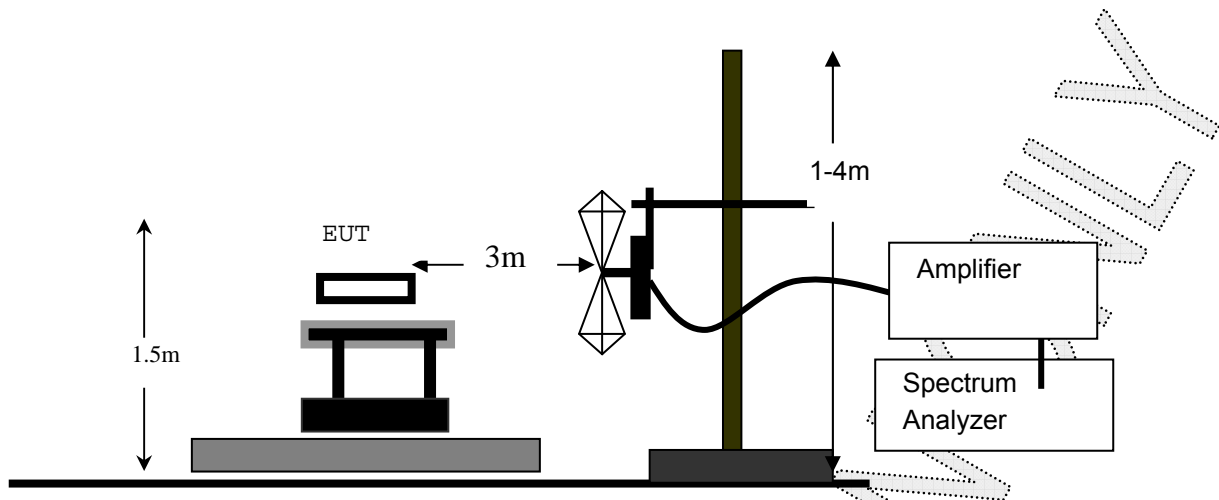
Where:

- $f$  is the frequency in GHz;
- $BW$  is the channel bandwidth in MHz.

The factor  $k$  is limited within the following:

- $0 < k < 40$  dB.

### 5.6.2 TEST CONFIGURATION



### 5.6.3 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 6.1 for the test conditions.
2. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.2.2 for the measurement method.

### 5.6.4 TEST RESULTS

The blocking level of the equipment is too low to the limit.

**Conclusion: PASS**

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## 5.7 Receiver spurious emissions

### 5.7.1 LIMIT

#### ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.3.5

The power of any spurious emission, conducted or radiated, shall not exceed the following values given below:

	Below 1000 MHz	Above 1000 MHz
Operating	2nW	20nW

Remark: The limits are applicable to all receiver classes.

### 5.7.2 MEASUREMENT EQUIPMENT USED

(Same as <Effective Radiated Power>)

### 5.7.3 TEST CONFIGURATION

(Same as <Effective Radiated Power>)

### 5.7.4 TEST PROCEDURE

1. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 6.1.1 / 6.1.2 for the test conditions.
2. Please refer to ETSI EN 300 440-1 (V.1.6.1) Sub-clause 8.3.2 / 8.3.3 / 8.3.4 for the measurement method.

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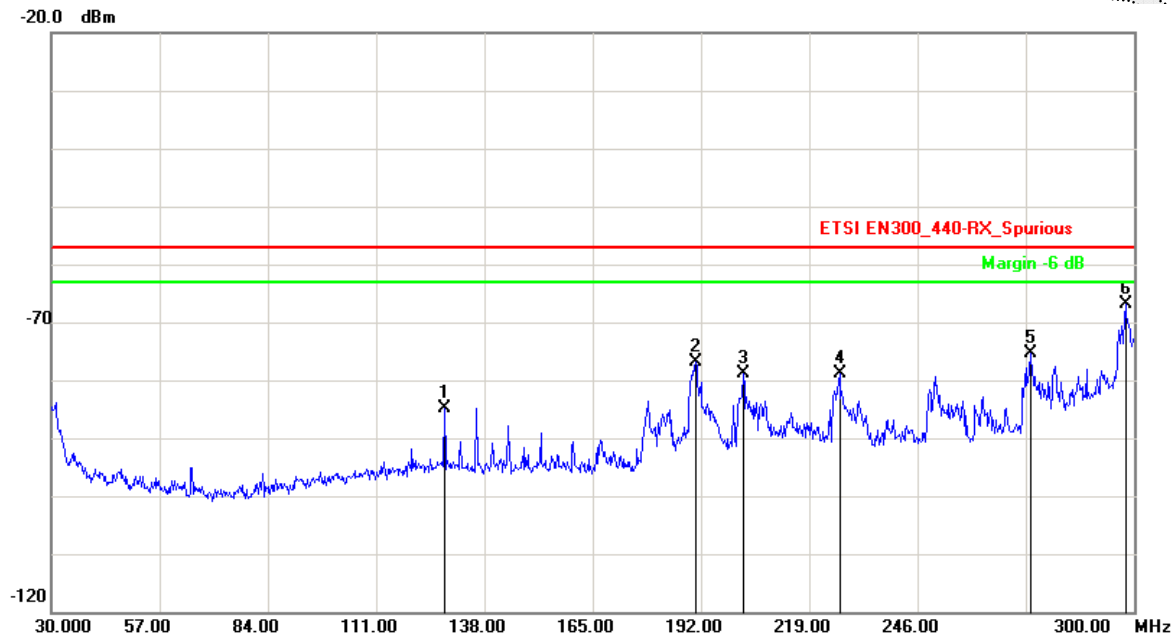
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## 5.7.5 TEST RESULTS

Channel:	RX	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	30MHz~1GHz		



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	128.0100	-16.26	-68.56	-84.82	-57.00	-27.82	peak
2	190.6500	-14.24	-62.66	-76.90	-57.00	-19.90	peak
3	202.5300	-11.75	-67.10	-78.85	-57.00	-21.85	peak
4	226.5600	-11.40	-67.40	-78.80	-57.00	-21.80	peak
5	274.0800	-8.90	-66.39	-75.29	-57.00	-18.29	peak
6	297.8400	-1.99	-64.90	-66.89	-57.00	-9.89	peak

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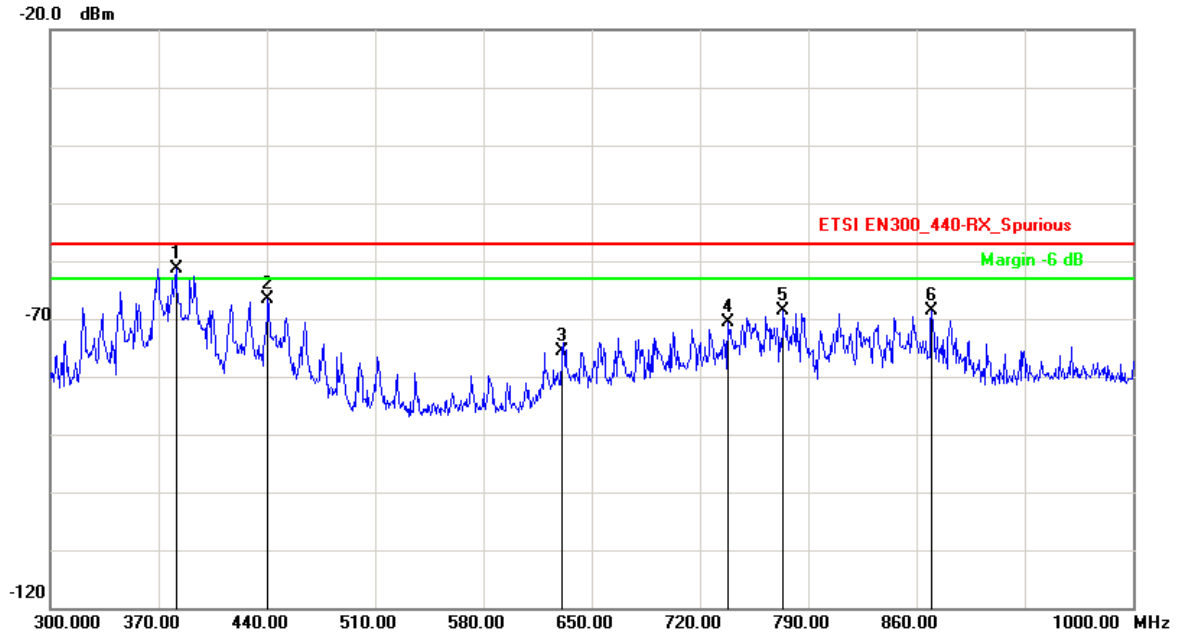
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	381.2000	-10.83	-50.51	-61.34	-57.00	-4.34	peak
2	440.7000	-8.84	-57.89	-66.73	-57.00	-9.73	peak
3	631.1000	-4.11	-71.45	-75.56	-57.00	-18.56	peak
4	738.2000	-2.10	-68.52	-70.62	-57.00	-13.62	peak
5	773.9000	-2.40	-66.30	-68.70	-57.00	-11.70	peak
6	869.8000	-0.88	-67.69	-68.57	-57.00	-11.57	peak

Channel:	RX	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	4273.046	0.79	-70.31	-69.52	-47.00	-22.52	peak
2	7522.545	10.34	-71.75	-61.41	-47.00	-14.41	peak

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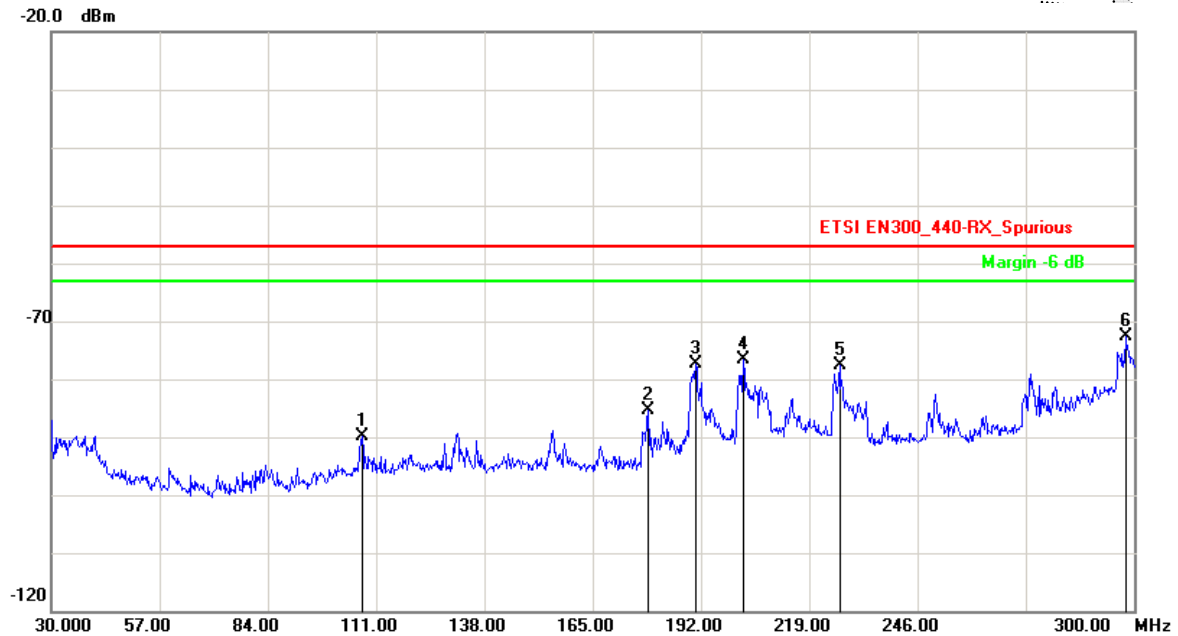
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Channel:	RX	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	30MHz~1GHz		



No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	107.4900	-17.53	-72.27	-89.80	-57.00	-32.80	peak
2	178.7700	-15.28	-70.21	-85.49	-57.00	-28.49	peak
3	190.6500	-14.24	-63.02	-77.26	-57.00	-20.26	peak
4	202.5300	-11.75	-64.89	-76.64	-57.00	-19.64	peak
5	226.5600	-11.40	-66.22	-77.62	-57.00	-20.62	peak
6	297.8400	-1.99	-70.71	-72.70	-57.00	-15.70	peak

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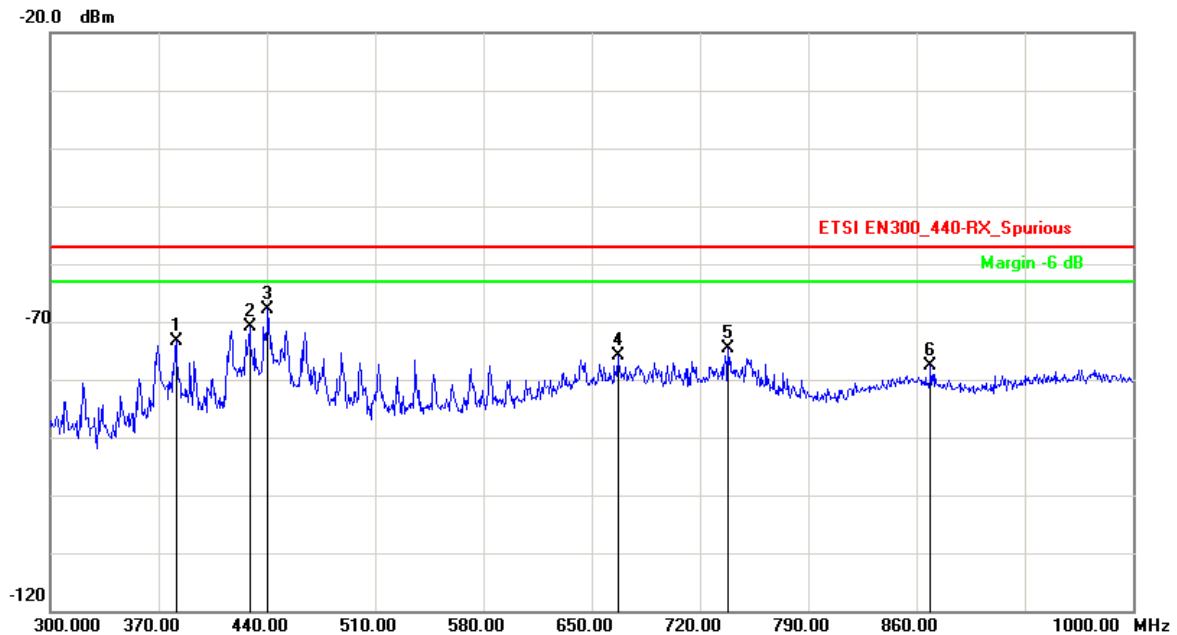
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No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	381.2000	-10.83	-62.61	-73.44	-57.00	-16.44	peak
2	428.8000	-9.33	-61.57	-70.90	-57.00	-13.90	peak
3	440.7000	-8.84	-58.99	-67.83	-57.00	-10.83	peak
4	666.8000	-3.39	-72.45	-75.84	-57.00	-18.84	peak
5	738.2000	-2.10	-72.41	-74.51	-57.00	-17.51	peak
6	869.1000	-0.86	-76.88	-77.74	-57.00	-20.74	peak

Channel:	RX	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	1GHz~12.75GHz		

No.	Frequency (MHz)	Factor (dB)	Reading (dBm)	Level (dBm)	Limit (dBm)	Margin (dB)	Det.
1	3919.840	-0.44	-71.36	-71.80	-47.00	-24.80	peak
2	6156.814	6.91	-67.92	-61.01	-47.00	-14.01	peak

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

**Note: Others frequency test level margin all >6dB**

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## 5.8 RF Exposure Evaluation

### 5.8.1 Limit

According to Council Recommendation: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation. Reference levels for electric, magnetic and electromagnetic fields (10MHz to 300GHz, unperturbed rms values)

Frequency Range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density ( $S_{eq}(W/m^2)$ )
0-1Hz	---	$3.2 \times 10^4$	$4 \times 10^4$	---
1-8Hz	10000	$3.2 \times 10^4 / f^2$	$4 \times 10^4 / f^2$	---
8-25Hz	10000	$4000 / f$	$5000 / f$	---
0.025-0.8KHz	$250 / f$	$4 / f$	$5 / f$	---
0.8KHz-3KHz	$250 / f$	5	6.25	---
3KHz-150KHz	87	5	6.25	---
0.15MHz-1MHz	87	$0.73 / f$	$0.92 / f$	---
1MHz-10MHz	$87 / f^{1/2}$	$0.73 / f$	$0.92 / f$	---
10MHz-400MHz	28	0.073	0.092	2
400MHz-2GHz	$1.375 f^{1/2}$	$0.0037 f^{1/2}$	$0.0046 f^{1/2}$	$f / 200$
2-300GHz	61	0.16	0.20	10

Note:

1. f as indicated in the frequency range column
2. For frequencies between 100KHz and 10GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$ , and  $B^2$  are to be averaged over any Six-minute period.
3. For frequencies exceeding 10GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$ , and  $B^2$  are to be averaged over any  $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1Hz, which are effectively static electric fields. For Most people the annoying perception of surface electric charges will not occur at field strengths Less than 25KV/m. Spark discharges causing stress or annoyance should be avoided.

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### 5.8.2 Test Results

From Council Recommendation 1999/519/EC table 2, the maximum power density is 10W/m<sup>2</sup>.

Power density (S) is calculated by the following formula:

$$S = (P \cdot G) / 4\pi R^2$$

Where, S = Power density (mW/cm<sup>2</sup>), P = Output power to antenna (mW), R = Distance between radiating structure and observation point (cm), G = Gain of antenna in numeric  $\pi = 3.1416$ .

### 5.8.3 RF Exposure Evaluation Assessment

<b>EUT parameter (data from the separate report)</b>	
Max average output power in Watt (TP)	-2.11dBm (0.000615 W)
Antenna gain (G)	0dBi (Numeric gain:1)
Minimum distance in meter (D) (from transmitting structure to the human body)	0.2m

<b>Exposure evaluation</b>	
<p>Given</p> $S = (P \cdot G) / 4\pi R^2$ <p>yield <math>S = (P \cdot G) / 4 \cdot 3.1416 \cdot 0.04 = 0.0012 \text{ W/m}^2</math></p>	<p>Where</p> <p>G: numerical gain of transmitting antenna;  TP: Transmitted power in watt;  D: distance from the transmitting antenna in meter</p>
<p><b>Conclusion:</b></p> <p>→ The maximum Equivalent plane wave power density of the device is 0.0012 W/m<sup>2</sup> and it is less than 10 W/m<sup>2</sup>, so it is compliance with exposure requirement of 1999/519/EC.</p>	

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## 6 USED TEST EQUIPMENT

### 6.1

Effective isotropic radiated power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2015/03/24
2	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2015/03/24
3	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2015/03/24
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2015/03/24
5	Pre-Amplifier	EMC	EMC330	980113	2015/03/24
6	Pre-Amplifier	EMC	EMC012645	980114	2015/03/24
7	Temperature Chamber	GW	GDS-150	1016	2015/03/24
8	Oscilloscope	Agilent	DSO6104A	MY40009313	2015/03/24
9	Power meter	ROHDE & SCHWARZ	NRVS	842856/049	2014/11/04

### 6.2

Frequency Range					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2015/03/24
2	Temperature Chamber	GW	GDS-150	1016	2015/03/24

### 6.3

Spurious Emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2015/03/24
2	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2015/03/24
3	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2015/03/24
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2015/03/24
5	Pre-Amplifier	EMC	EMC330	980113	2015/03/24
6	Pre-Amplifier	EMC	EMC012645	980114	2015/03/24
7	EMI Test Software	Farad	EZ-EMC	N/A	N/A

### 6.4

Dwell Time					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2015/03/24

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## 7 TEST SETUP PHOTOS OF THE EUT



TX EIRP below 1G



TX EIRP above 1G



RX EIRP below 1G

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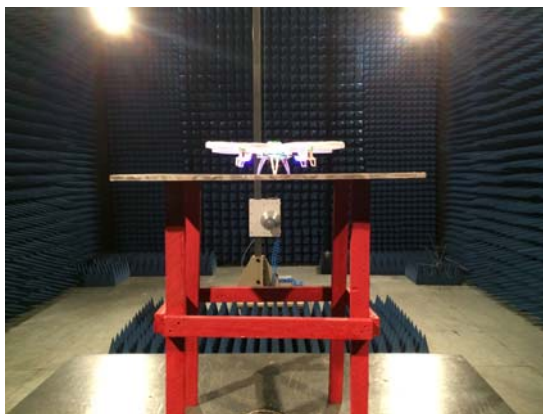
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RX EIRP above 1G

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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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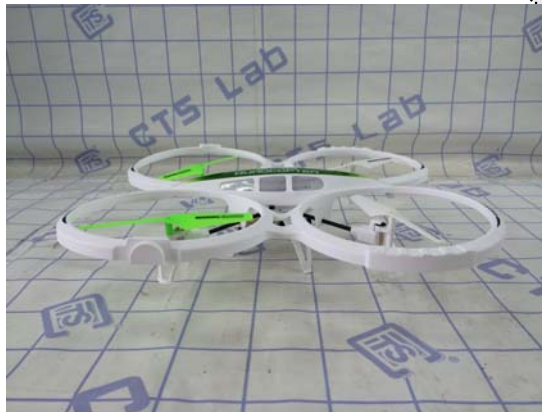
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RX External view 3



RX External view 4



RX External view 5

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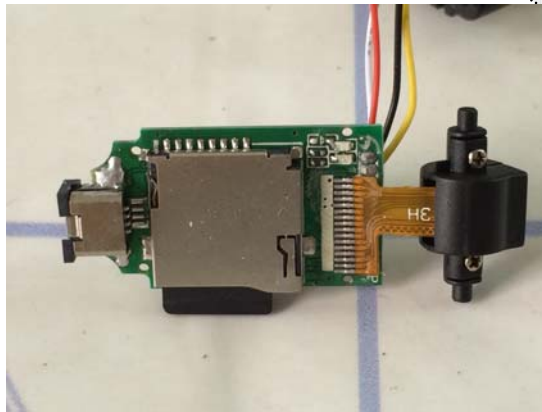
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RX External view 6



RX PCB 1 view 1



RX PCB 1 view 2

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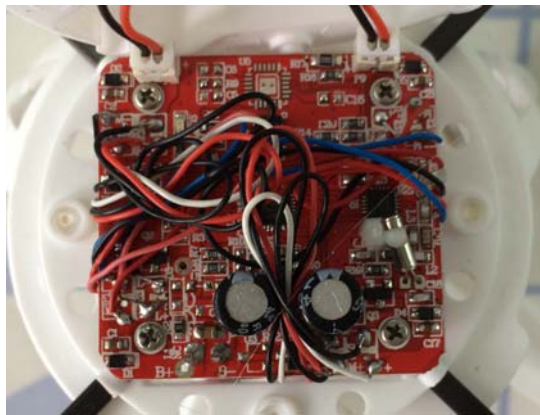
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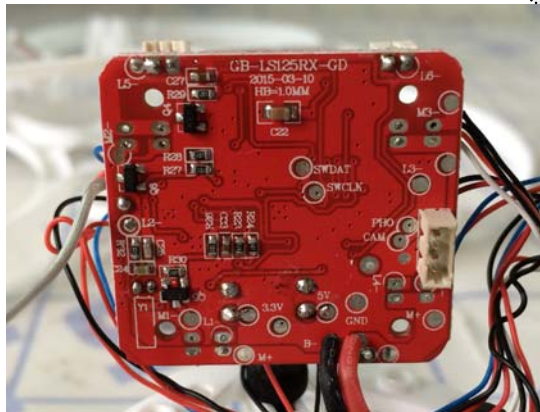
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RX PCB 2 view 1



RX PCB 2 view 2



TX External view 1

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TX External view 2



TX External view 3



TX External view 4

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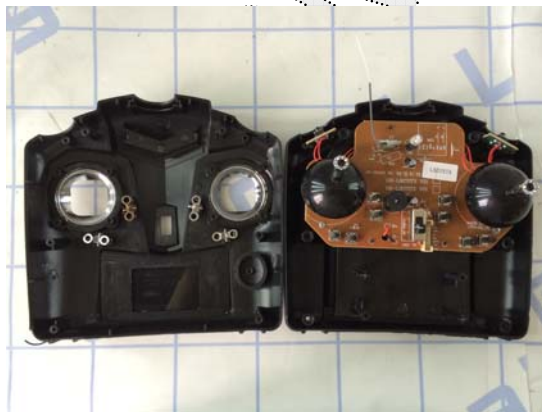
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TX External view 5



TX External view 6



TX Internal view

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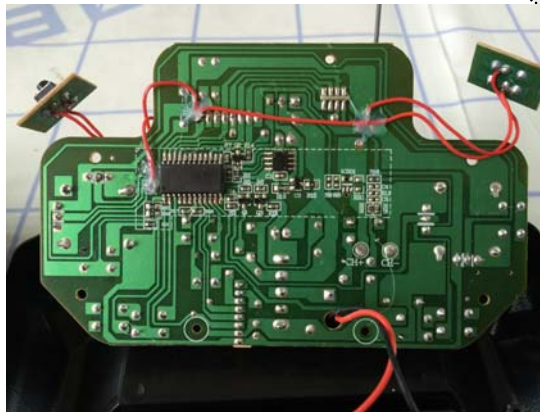
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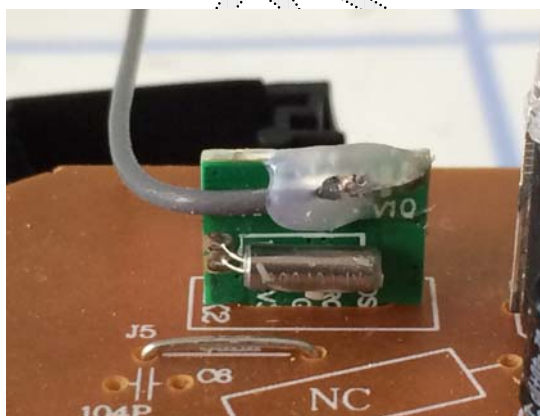
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TX PCB 1 view 1



TX PCB 1.view-2



Module view 1

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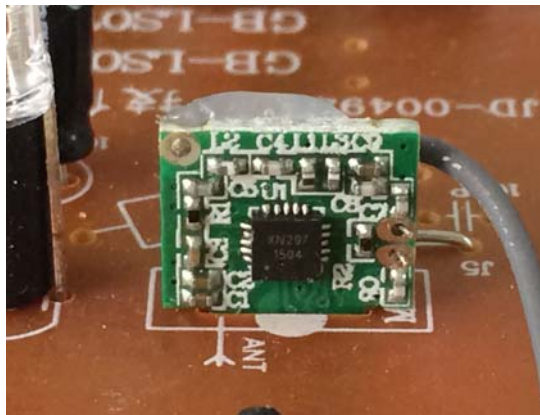
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**Module view 2****Battery view**

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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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