

MAY CHEONG TOY PRODUCTS FTY., LTD

TEST REPORT

SCOPE OF WORK

RAIDO FREQUENCY AND EMC TESTING--81018(13086/81077)
ADDITIONAL MODELS: SEE PAGE 7

REPORT NUMBER

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RADIO COMMUNICATIONS AND EMC TESTING REPORT

MAY CHEONG TOY PRODUCTS FTY., LTD

Model: 81018(13086/81077)
Additional Models: See Page 7

1:24 Radio Control Vehicles, Assorted
Additional Names: See Page 7

Test Report No. : SZHH01152706-003S5

Remark: This report base on the previous report with report No. SZHH01152706-003S4 dated 30 Oct 2019. Only add model numbers, don't test after engineer evaluate.

Test Engineer :	Maura Wang Engineer	Sign On File
Report Approved By :	Jimmy Wen Assistant Manager	
Date :	18 Dec 2019	

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RADIO PERFORMANCE MEASUREMENTS RESULT SUMMARY

Requirements	ETSI EN 300 220-2	ETSI EN 300 220-1	Compliance
	Clause Number		
Operating Frequency	4.2.1	5.1.1	Complied
Effective Radiated Power	4.3.1	5.2.1	Complied
Unwanted emissions in the spurious domain (Transmitter Portion)	4.2.2	5.9.1	Complied
Unwanted emissions in the spurious domain (Receiver Portion)	4.2.2	5.9.1	Complied
Adjacent Channel Power	4.3.7	5.11.1	N/A
Tx Out Of Band Emissions	4.3.5	5.8.1	Complied
TX behaviour Under Low-voltage Conditions	4.3.8	5.12.1	Complied
Transient Power	4.3.6	5.10.1	Complied
Blocking	4.4.2	5.18.1	Complied
Occupied Bandwidth	4.3.4	5.6.1	Complied
Duty Cycle	4.3.3	5.4.1	Complied
When determining of the test conclusion, the Measurement Uncertainty of test has been considered.			

**EMC COMPLIANCE MEASUREMENTS
RESULT SUMMARY**

	ETSI EN 301 489-3	ETSI EN 301 489-1	Compliance
	Clause Number		
EMC Emission	7.2	8.2	Complied
Electrostatic Discharge	7.3	9.3	Complied
Radio Frequency Electromagnetic Field(80MHz-6GHz)	7.3	9.2	Complied

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

EQUIPMENT UNDER TEST (EUT) INFORMATION

Applicant: MAY CHEONG TOY PRODUCTS FTY., LTD
UNIT 901-2, 9/F., EAST OCEAN CENTRE, 98 GRANVILLE ROAD,
TSIMSHATSUI EAST, KOWLOON, HONG KONG

Description of EUT : 1:24 Radio Control Vehicles, Assorted

Brand Name(s) / Type Number(s) : Maisto / 81018(13086/81077)

Serial Number(s) : Not Labelled

Equipment Received : 11 May 2017

Test Date(s) : 11 May 2017 to 21 May 2017

Type of EUT : RC Toys

Receiver category of EUT : Class 2

Temperature Category of EUT: Category I: -20°C to +55°C

Type of Modulation: Pulse Modulation

Test Specification(s) : ETSI EN 300 220-2: V3.1.1 (2017-02)
ETSI EN 300 220-1: V3.1.1 (2017-02)
Draft ETSI EN 301 489-1 V2.2.0 (2017-03)
Final Draft ETSI EN 301 489-3 V2.1.1 (2017-03)

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EXHIBIT 1

GENERAL DESCRIPTION

1 INTRODUCTION

Intertek Testing Services Shenzhen Limited Longhua Branch (address: 1F/2F, Building B, QiaoAn Scientific Technology Park, ShangKeng Community, GuanHu Subdistrict, LongHua District, ShenZhen. P.R. China, 518110) has tested the MAY CHEONG TOY PRODUCTS FTY., LTD, 1:24 Radio Control Vehicles, Assorted , 81018(13086/81077). The sample was tested to the relevant performance specification published by the European Telecommunications Standards Institute. This report contains the results of these tests and is submitted MAY CHEONG TOY PRODUCTS FTY., LTD as the final test results.

The model: 81018 is package numbers which include a transmitter and a receiver, the transmitter model number is 13086, receiver model number is 81077. The additional transmitter models: 12093, 13044, 13092 are same as the model: 13086 and the additional package numbers are same as the model: 81018 in hardware aspect. Theirs models are difference in the appearance and model number and model names.

Additional Models:

Production name	Model No.
1:24 Licensed R/C Vehicles, Asst. ; 1:24 R/C Asst.;	81016/81017/81018/81056/81141/81217/
1:24 Radio Control vehicles, Assorted;	83018 (81051/81052/81053/81054/81055/81057/
1:24 CSRC with working headlights Asst.;	81058/81059/81061/81062/81063/81064/81065/
1:24 CSRC with working headlights Asst.;	81066/81067/81068/81073/81074/81078/81079/
1:24 R/C with stick controller, Asst.;	81082/81086/81091/81126/81142/81087/81088/
1:24 R/C in mailer box pack;	81089/81159/81185/81186/81090/81160/81501/81502);
1:24 H-D Custom RC VW Van Samba;	81681(81144)81165 (10043/10044);
Radio Control Vehicle 7.5" non-licensed R/C;	81250(81251/81252/81253/81254/81255);
1:14 R/C Formula, asst. ; 1:24 Race R/C, Asst.;	81140 (81145/81146/81147/81148/81181/81194);
HD RC Motorcycle - XL 1200N Nightster With Rider	81660(81661) ; 81190/81191/81074/81084/ 81143/ 81127 ;
1:24 Ferrari RC - Ferrari SF15-T;	81202(12051/12118); 82066/82086(15961/13086);
1:24 Red Bull RC - Infiniti Red Bull Racing RB11;	82040 (82041/82042); 81210
Radio Control Vehicle 1:24 Formula R/C - Ferrari F138;	(81211/81212/81213/8124/81215/81216);
Radio Control Vehicle 1:18 R/C Red Bull Racing RB9;	82070(82075/82076/82077/82078/82079/
Radio Control Vehicle 1:24 R/C Red Bull Racing RB9;	82080/82081/82082/82083/82084);
1:16 R/C Recon Rove; Radio Control Vehicle Light	82054/ 82094 (16932 /16890);
Runners R/C, Asst. ;Cyklone 360 ; Cyklone 360; 1:16	82170(82164/82165/82166/82167/82168/82169);
Harley-Davidson Custom RC ;1:24 R/C in horizontal	81276, 81272P, 82091,
smaller box;	81219/81204/81380/81381/81382/
1:10 Badlanders asst.; Cyklon Twist / Cyklon Twist;	81383/81384/81385/81386/81387/81388/81389/81390
1:18 Vision GT RC, asst.; R/C CYKLONE 360 TURBO	82048/81504/81506
POLICE; 1/14 R/C Chevrolet Camaro SS PATROL	81442/82503(18797)
POLICE; 1:24 RC Samba bus with Light & Sound function,	81507/81508/81509/81510/81511/81512/81513/81514/
emergency decoration;	81515/81516/81517/81518/81519/81520
1:24 Red Bull RC - Infiniti Red Bull Racing RB13	82321/82322/82323/82324/82325
1:24 Racing Series RC - 2017 Ferrari Formula 1 SF70-H	

The production units are required to conform to the initial sample as received when the units are placed on the market.

2 TEST SPECIFICATION

2.1 RELEVANT PERFORMANCE SPECIFICATION

The relevant performance specifications for MAY CHEONG TOY PRODUCTS FTY., LTD, 1:24 Radio Control Vehicles, Assorted , 81018(13086/81077) are the harmonised standard is ETSI EN 300 220-2 V3.1.1 (2017-02) and the technical standards are ETSI EN300 220-1 V3.1.1 (2017-02), Final Draft ETSI EN301 489-3 V2.1.1 (2017-03) and Draft ETSI EN301 489-1 V2.2.0 (2017-03).

The tests performed are those required to demonstrate compliance with the essential requirements of Article 3.1(b) and 3.2 of the Radio Equipment Directive - RED for regulatory purposes.

2.2 TEST ENVIRONMENT

The tests were performed in the Radio communications and Electromagnetic Compatibility Test Facility at Intertek Testing Services Shenzhen Limited Longhua Branch (CNAS No.: L0327). The sample was subjected to the ambient conditions in the laboratory and indoor test site except during tests at extremes of temperatures and the Radiated Emissions Tests. The temperature and relative humidity recorded during the period of each test are given in the results.

2.3 CONFIGURATION OF TEST SAMPLE

The test sample consisted of one transmitter and one receiver.

2.4 TEST POWER SOURCES

The sample of transmitter is intended to operate from battery DC 3.0V (2 x 1.5V AAA batteries).The test power source voltage declared by the manufacturer were:

Nominal test voltage (V_{nom})	DC 3.0V
Lower extreme test voltage (V_{min})	DC 2.4V
Upper extreme test voltage (V_{max})	DC 3.0V

The sample of receiver is intended to operate from battery FORMTEXT |DC 3.0V (2 x 1.5V AA batteries).

2.5 TEST FREQUENCIES

The nominal operating frequency 27.143 MHz at DC 3.0V.

2.6 MEASUREMENT UNCERTAINTY

All measurement uncertainties stated in this report are estimated to a 95% confidence level.

2.7 SUPPORT EQUIPMENT – RADIO PERFORMANCE MEASUREMENTS

N/A

2.8 SUPPORT EQUIPMENT – EMC COMPLIANCE MEASUREMENTS

N/A

2.9 PERFORMANCE CRITERIA**2.9.1 PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA (CT & CR)**

At the conclusion of the test the EUT shall operated as intended with no loss of user control functions or stored data, the communication link shall have been maintained during the test.

Where the EUT is transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

2.9.2 PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA (TT & TR)

At the conclusion of each exposure the EUT shall operated with no user noticeable loss of communication link.

Where the EUT is transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

EXHIBIT 2

**TEST RESULT
OF
RADIO PERFORMANCE MEASUREMENTS**

3 EFFECTIVE RADIATED POWER (ERP) AND SPURIOUS EMISSIONS

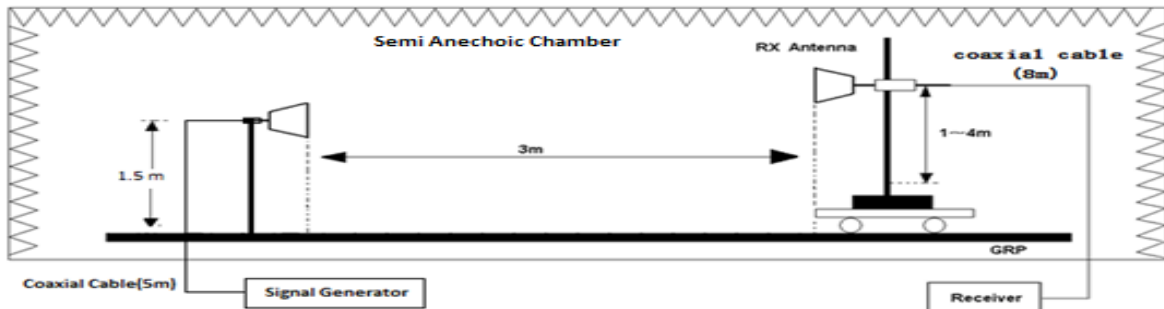
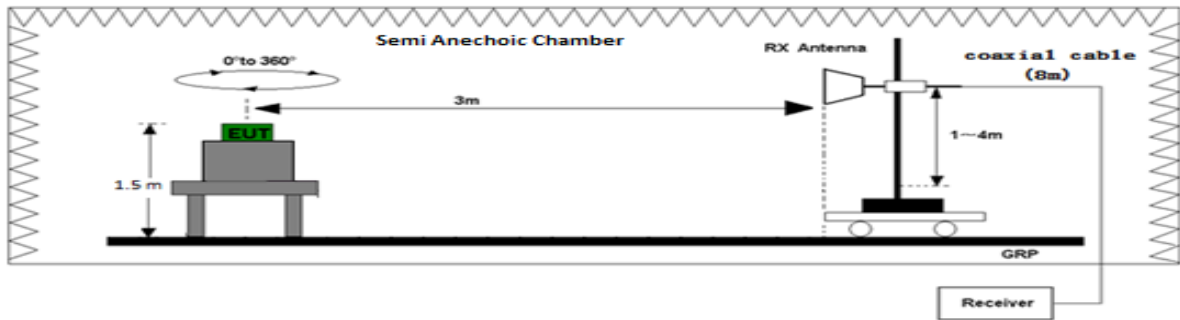
3.1 TEST METHOD AND SUMMARY

	Effective Radiated Power (ERP)	Spurious Emissions	
Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)		
Clause :	4.3.1	4.2.2	4.2.2
Application :	Transmitter with an Integral or Dedicated Antenna	All Transmitters	All Receivers

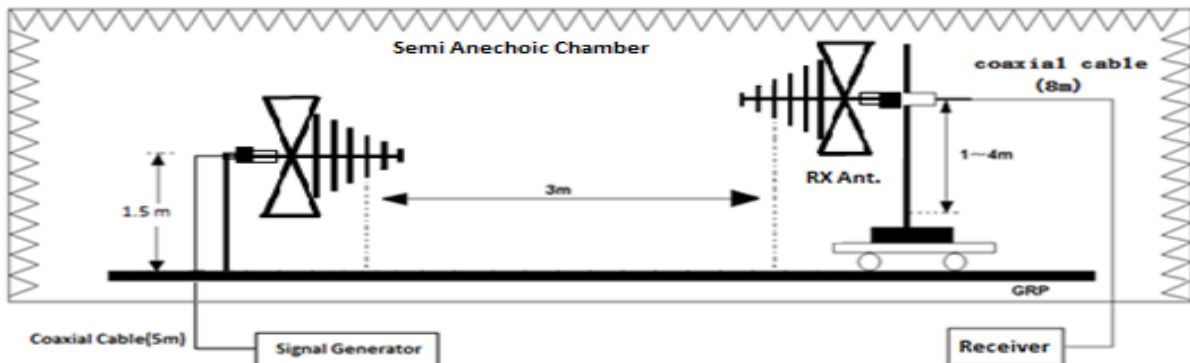
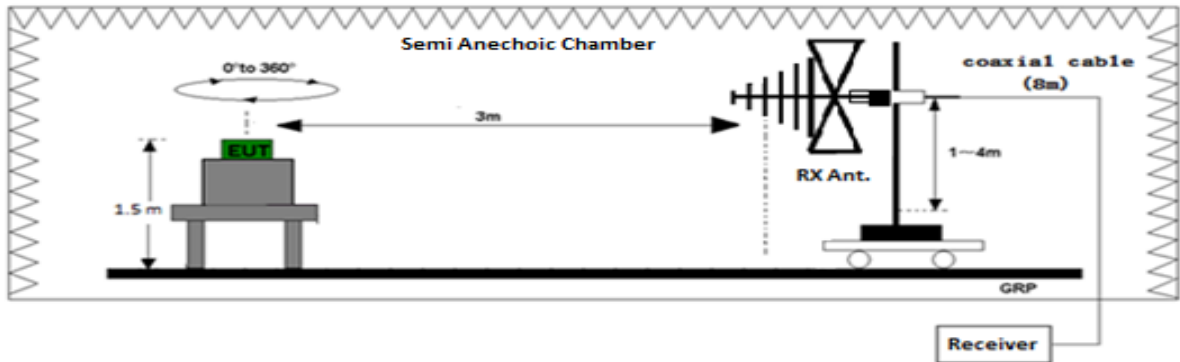
3.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ185-01	EMI Receiver	R&S	ESCI	6-Jan-17	6-Jul-17
SZ056-03	Spectrum Analyzer	R&S	FSP	14-Jun-16	14-Jun-17
SZ061-03	BiConiLog Antenna	ETS	3142C	12-Oct-16	12-Oct-17
SZ061-07	Pyramidal Horn Antenna	ETS	3115	12-Oct-16	12-Oct-17
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	30-May-16	30-May-17
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	16-Apr-16	16-Apr-18
SZ062-02	RF Cable	RG 213U	N/A	6-Jan-17	6-Jul-17
SZ062-05	RF Cable	0.04-26.5GHz	N/A	16-Mar-17	16-Sep-17

3.3 Test Setup



Test set-up of radiated disturbance (above 1GHz)



Test set-up of radiated disturbance (30MHz-1GHz)

3.4 TEST RESULT - EFFECTIVE RADIATED POWER (ERP) - TRANSMITTER PORTION

Ambient Test Conditions: Temperature 25°C; Humidity 50%

Polarization	Frequency (MHz)	ERP (mW)	ERP (dBm)	Limit (dBm)	Margin (dB)
V	27.143	0.0040	-24	10	-34.0

Notes:

1. Negative sign (-) in the margin column signify levels below the limit.
2. 10dBm corresponds to 10mW
3. Measurement uncertainty is ± 4.8 dB at a level of confidence of 95%.

3.5 TEST RESULT – SPURIOUS EMISSIONS (TRANSMITTER PORTION)

3.5.1 CONDUCTED

Not applicable. Equipment has integral antenna.

3.5.2 RADIATED

3.5.2.1 SPURIOUS EMISSIONS – OPERATING

Test Conditions: Temperature 25.0°C; Humidity 50.0%

Polarization	Frequency (MHz)	ERP at 3m (dBm)	ERP Limit at 3m (dBm)	Margin (dB)
V	54.366	-56.9	-54.0	-2.9
V	81.549	-64.2	-36.0	-28.2
V	108.732	-82.3	-54.0	-28.3
V	135.915	-82.1	-36.0	-46.1
V	163.098	-75.0	-36.0	-39.0
V	190.281	-73.5	-54.0	-19.5

No emissions significantly above equipment noise floor.

Notes:

1. Negative sign (-) in the margin column signify levels below the limit.
2. Other emissions found were at least 10 dB below the limit.
3. -54 dBm corresponds to 4 nW
4. -47 dBm corresponds to 20 nW.
5. -36 dBm corresponds to 250 nW
6. -30 dBm corresponds to 1000 nW.
7. Measurement uncertainty is ± 4.8 dB at a level of confidence of 95%.

3.5.2.2 SPURIOUS EMISSIONS – STANDBY

There were no emissions found above system measuring level (at least 10 dB below the limit).

The transmitter cannot be operated in the standby mode. (WITHOUT STAND-BY MODE)

(STAND BY MODE WITH TABLE)

Polarization	Frequency (MHz)	ERP at 3m (dBm)	ERP Limit at 3m (dBm)	Margin (dB)
/	/	/	/	/

Notes:

1. Negative sign (-) in the margin column signify levels below the limit.
2. Other emissions found were at least 10 dB below the limit.
3. -57 dBm corresponds to 2 nW
4. -47 dBm corresponds to 20 nW.
5. -36 dBm corresponds to 250 nW
6. -30 dBm corresponds to 1000 nW.
7. Measurement Uncertainty : ± 4.8 dB at a level of confidence of 95%.

3.6 TEST RESULT – SPURIOUS EMISSIONS (RECEIVER PORTION)

3.6.1 CONDUCTED

Not applicable. Equipment has integral antenna.

3.6.2 RADIATED

3.6.2.1 SPURIOUS EMISSIONS – OPERATING

Test Conditions: Temperature 25.0°C; Humidity 50.0%).

Polarization	Frequency (MHz)	ERP at 3m (dBm)	ERP Limit at 3m (dBm)	Margin (dB)
/	/	/	/	/

No emissions significantly above equipment noise floor.

Notes:

1. Negative sign (-) in the margin column signify levels below the limit.
2. Other emissions found were at least 10 dB below the limit.
3. -57 dBm corresponds to 2 nW.
4. -47 dBm corresponds to 20 nW.
5. Measurement uncertainty is ± 4.8 dB at a level of confidence of 95%.

3.6.2.2 SPURIOUS EMISSIONS –STANDBY

No Test Result.

4 PERMITTED RANGE OF OPERATING FREQUENCY

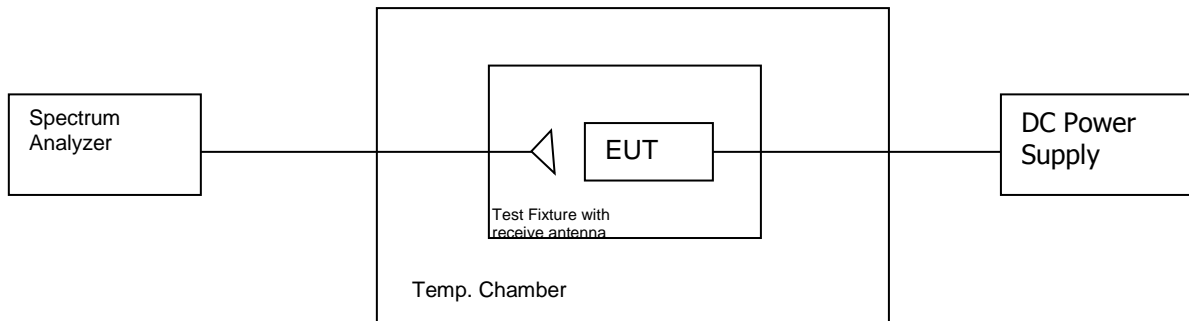
4.1 TEST METHOD AND SUMMARY

Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.2.1
Application :	all transmitter

4.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

4.3 Test Setup



4.4 TEST RESULT

Test Conditions		Frequency (MHz)	Frequency Drift (Hz)
Nominal frequency stated by the manufacturer: <u>27.143MHz</u>			
H _{nom} 50.0% T _{nom} 25.0°C	V _{DC nom} DC 3.0V	27.143	0.0
Value		Notes	
Operational Frequency Band		27.143000MHz	Declared by manufacturer
Nominal Operating Frequency		27.143MHz	Declared by manufacturer
Operating Channel Width-OCW		16.4kHz	Declared by manufacturer

Note:

1. The Assigned Frequency Band is 26.957-27.283MHz.
2. Measurement uncertainty is ± 0.5 ppm at a level of confidence of 95%.

5 ADJACENT CHANNEL POWER

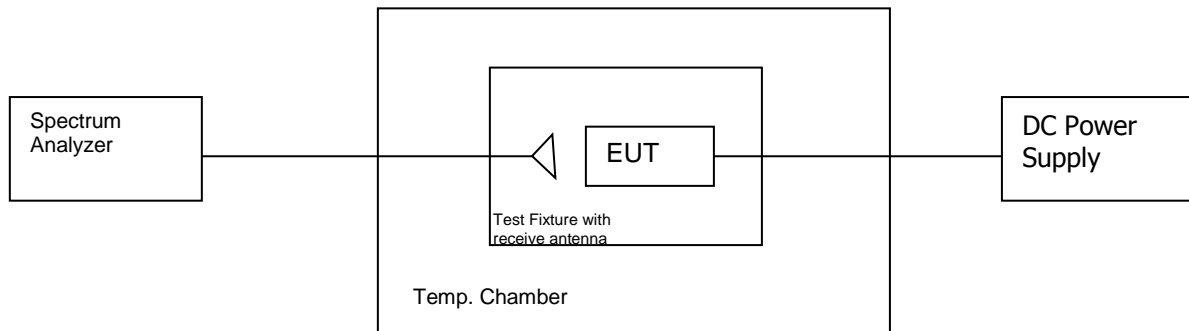
5.1 TEST METHOD AND SUMMARY

Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.7
Application :	all transmitter with OCW \leq 25 kHz

5.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

5.3 Test Setup



5.4 TEST RESULT

5.4.1 TEST RESULT – DC TEST VOLTAGE

Adjacent Channel Power

Test Conditions <input checked="" type="checkbox"/> OCW < 20kHz / <input type="checkbox"/> 20kHz ≤ OCW ≤ 25kHz	Adjacent channel	Attenuation (dBc)	Adjacent channel power (dBm)	Limit (dBm)	Result
V _{nom} : DC 3.0V T _{nom} : 25.0°C RH _{nom} : 50.0%	Lower	11.3	-37.7	-20.0 dBm	Complied
	Upper	11.3	-36.4		Complied
V _{max} : DC 3.0V T _{max} : +55°C RH _{max} : 50.0 %	Lower	11.3	-35.5	-15.0 dBm	Complied
	Upper	11.3	-34.5		Complied
V _{min} : DC 2.4V T _{max} : +55°C RH _{max} : 50.0%	Lower	11.3	-36.1		Complied
	Upper	11.3	-35.8		Complied
V _{max} : DC 3.0V T _{min} : -20°C RH _{min} : 0 %	Lower	11.3	-38.7		Complied
	Upper	11.3	-39.3		Complied
V _{min} : DC 2.4V T _{min} : -20°C RH _{min} : 0 %	Lower	11.3	-39.0		Complied
	Upper	11.3	-40.2		Complied

Alternate Adjacent Channel Power

Test Conditions <input checked="" type="checkbox"/> OCW < 20kHz / <input type="checkbox"/> 20kHz ≤ OCW ≤ 25kHz	Adjacent channel	Attenuation (dBc)	Adjacent channel power (dBm)	Limit (dBm)	Result
V _{nom} : DC 3.0V T _{nom} : 25.0°C RH _{nom} : 50.0%	Lower	11.3	-39.2	-20.0 dBm	Complied
	Upper	11.3	-39.1		Complied
V _{max} : DC 3.0V T _{max} : +55°C RH _{max} : 50.0 %	Lower	11.3	-37.5	-20.0 dBm	Complied
	Upper	11.3	-37.1		Complied
V _{min} : DC 2.4V T _{max} : +55°C RH _{max} : 50.0%	Lower	11.3	-38.3		Complied
	Upper	11.3	-38.3		Complied
V _{max} : DC 3.0V T _{min} : -20°C RH _{min} : 0 %	Lower	11.3	-40.5		Complied
	Upper	11.3	-40.8		Complied
V _{min} : DC 2.4V T _{min} : -20°C RH _{min} : 0 %	Lower	11.3	-41.3		Complied
	Upper	11.3	-41.3		Complied

Remark:

- 15.0dBm corresponds to 32 μW
- 20.0dBm corresponds to 10 μW
- 32.0dBm corresponds to 630 nW
- 37.0dBm corresponds to 200 nW
- 40.0dBm corresponds to 100 nW

Note:

Measurement uncertainty is ±3.0dB at a level of confidence of 95%.

6 TX OUT OF BAND EMISSIONS

6.1 TEST METHOD AND SUMMARY

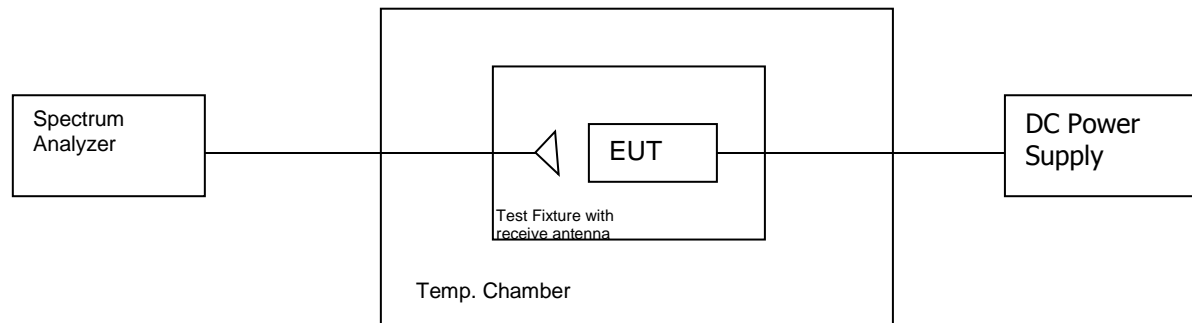
Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.5
Application :	all transmitter with OCW >25 kHz

6.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

* The Equipment would be verified together with the test system before testing.

6.3 TEST SETUP



6.4 TEST LIMIT

Domain	Frequency Range	RBW _{REF}	Max power limit
OOB limits applicable to Operational Frequency Band (See Figure 6)	$f \leq f_{low_OFB} - 400 \text{ kHz}$	10 kHz	-36 dBm
	$F_{low_OFB} - 400 \text{ kHz} \leq f \leq f_{low_OFB} - 200 \text{ kHz}$	1 kHz	-36 dBm
	$f_{low} - 200 \text{ kHz} \leq f < f_{low_OFB}$	1 kHz	See Figure 6
	$f = f_{low_OFB}$	1 kHz	0 dBm
	$f = f_{high_OFB}$	1 kHz	0 dBm
	$F_{high_OFB} < f \leq f_{high_OFB} + 200 \text{ kHz}$	1 kHz	See Figure 6
	$F_{high_OFB} + 200 \text{ kHz} \leq f \leq f_{high_OFB} + 400 \text{ kHz}$	1 kHz	-36 dBm
OOB limits applicable to Operating Channel (See Figure 5)	$F_{high_OFB} + 400 \text{ kHz} \leq f$	10 kHz	-36 dBm
	$f = f_c - 2.5 \times \text{OCW}$	1 kHz	-36 dBm
	$f_c - 2.5 \times \text{OCW} \leq f \leq f_c - 0.5 \times \text{OCW}$	1 kHz	See Figure 5
	$f = f_c - 0.5 \times \text{OCW}$	1 kHz	0 dBm
	$f = f_c + 0.5 \times \text{OCW}$	1 kHz	0 dBm
	$f_c + 0.5 \times \text{OCW} \leq f \leq f_c + 2.5 \times \text{OCW}$	1 kHz	See Figure 5
	$f = f_c + 2.5 \times \text{OCW}$	1 kHz	-36 dBm

NOTE: f is the measurement frequency.
 f_c is the Operating Frequency.
 F_{low_OFB} is the lower edge of the Operational Frequency Band.
 F_{high_OFB} is the upper edge of the Operational Frequency Band.
OCW is the operating channel bandwidth.

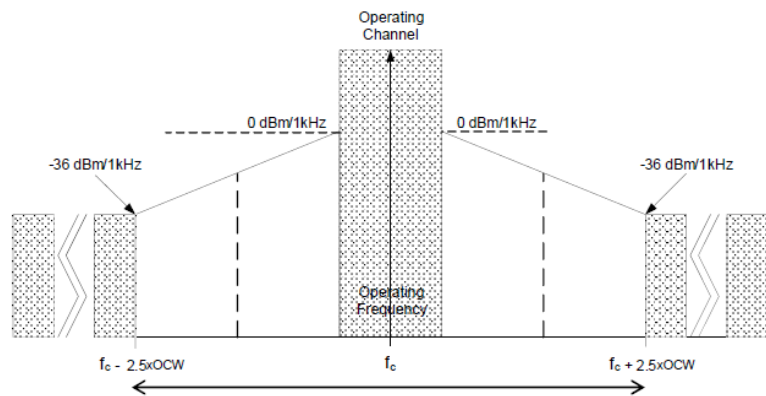


Figure 5: Out Of Band Domain for Operating Channel with reference BW

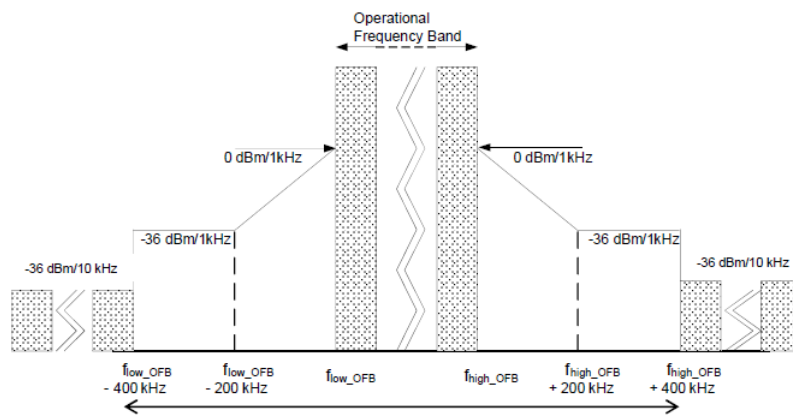


Figure 6: Out Of Band Domain for Operational Frequency Band with reference BW

6.5 TEST RESULT AND PLOTS

6.5.1 TEST RESULT – DC TEST VOLTAGE

Not Applicable

Remark:

1. 0.0dBm corresponds to 1mW
2. -36.0 dBm corresponds to 250nW
3. If the waveforms exceeds the limit mask, the test does not complied.

Note:

1. Measurement uncertainty is ± 3.0 dB at a level of confidence of 95%.

7 TX BEHAVIOUR UNDER LOW-VOLTAGE CONDITIONS

7.1 TEST METHOD AND SUMMARY

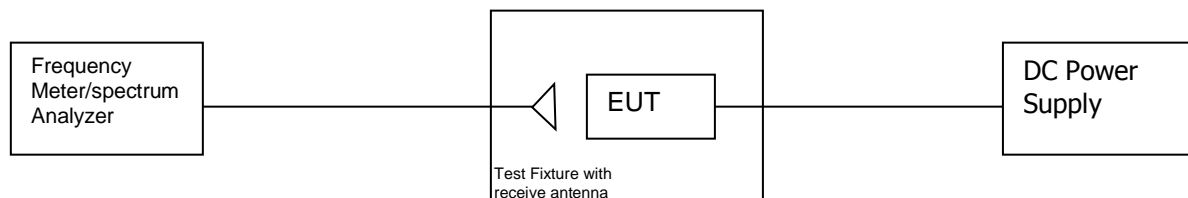
Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.8
Application :	Battery-Operated Transmitter

7.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

* The Equipment would be verified together with the test system before testing.

7.3 TEST SETUP



7.4 TEST RESULT

Test Conditions: Ambient

Below Lower Extreme Test Voltage (V)	Frequency (MHz)	Frequency Drift (Hz)	Limit (Hz)	Result
2.4	27.143060	60	Within Operational Frequency Band	Complied
2.0	27.142940	-60	Within Operational Frequency Band	Complied
1.5	27.142780	-220	Within Operational Frequency Band	Complied
1.2	27.142700	-300	Within Operational Frequency Band	Complied

Notes:

1. The effective radiated power of the transmitter is below the spurious emission limit. Therefore, the transmitter is deemed to comply with this test.
2. When the test voltage is below 1.2VDC, the effective radiated power of the transmitter is below the spurious emission limit.
 The transmitter ceases to function below VDC.
3. The Assigned Frequency Band: 26.957-27.283MHz.
4. Measurement uncertainty is ± 17 Hz at a level of confidence of 95%.

8 TRANSIENT POWER

8.1 TEST METHOD AND SUMMARY

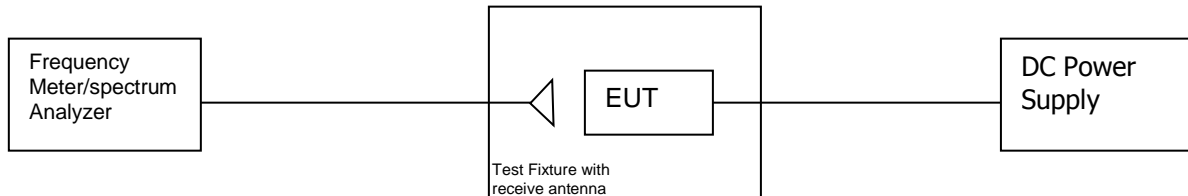
Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.6
Application :	All transmitters

8.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

* The Equipment would be verified together with the test system before testing.

8.3 TEST SETUP



8.4 TEST RESULT

Test Conditions: Temperature 25.0°C; Humidity 50.0%

Measurement points: offset from centre frequency	Analyser RBW (kHz)	Limit (dBm)	Transient Power (dBm)	Result
- 0,5 x OCW - 3 kHz:*	1	0	N/A	Complied
+ 0,5 x OCW + 3 kHz:*				
- max (12,5 kHz, OCW)	Max (RBW pattern 1/3/10) ≤ Offset frequency/6 =	0	-59.3	Complied
+ max (12,5 kHz, OCW)			-60.1	
-0,5 x OCW - 400 kHz	100	-27	-47.5	Complied
0,5 x OCW + 400 kHz			-48.7	
-0,5 x OCW -1 200 kHz	300	-27	-51.7	Complied
0,5 x OCW + 1200kHz			-59.2	

*Not applicable for OCW <25kHz

8.5 TEST LIMIT:

Absolute offset from centre frequency	RBW _{REF}	Peak power limit applicable at measurement points
≤ 400 kHz	1 kHz	0 dBm
> 400 kHz	1 kHz	-27 dBm

Note:

1. Measurement uncertainty is ± 4.8dB at a level of confidence of 95%.
2. OCW is 16.4KHz.

9 BLOCKING

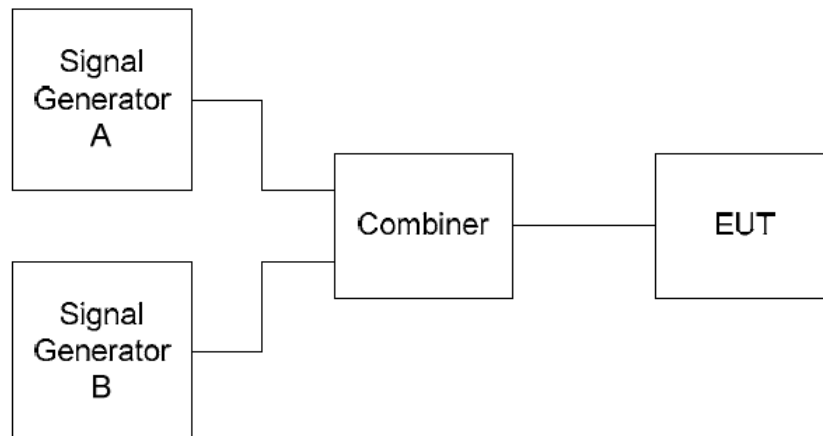
9.1 TEST METHOD AND SUMMARY

Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.4.2
Application :	All category of receiver

9.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP	14-Jun-16	14-Jun-17
SZ070-16	Combiner	Mini-Circuits	ZFSC-2-2500-S+	27-Oct-16	27-Oct-17
SZ180-01	Signal Generator	R&S	SML03	23-May-16	23-May-17
SZ180-02	Signal Generator	Aeroflex	2023A	9-Feb-17	9-Feb-18
SZ070-18	Adjust Attenuator	Agilent	8495B & 8494B	9-Feb-17	9-Feb-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17
SZ068-01	Acoustical Shielded Case	R/S	AF-BOX	6-Jan-17	6-Jul-17
SZ062-14	RF cable	Tek	Torc080	6-Jan-17	6-Jul-17

9.3 TEST SETUP



9.4 TEST RESULT

Test Conditions: Temperature 25.8°C; Humidity 62.0%

Power level of Signal Generator A = -20.6dBm

Test Frequency offset (MHz) (OCW: <u>16.4KHz</u>) (Centre Frequency: <u>27.143MHz</u>)		Unwanted Emission Power Level Signal B (dBm)	Limit (For Receiver Category 2)	Result
OC Egde +/-2MHz	Lower: 25.145	-5.6	-69 dBm	Complied
	Upper: 29.145	-4.8		Complied
OC Egde +/-10MHz	Lower: 17.145	-3.2	-44 dBm	Complied
	Upper: 37.145	-4.8		Complied
MAX (+/-5% of F _{Centre} or +/- 15 MHz)	Lower: 12.145	-1.8	-44 dBm	Complied
	Upper: 42.145	-1.3		Complied

Note:

1. Measurement uncertainty is ± 4.8 dB at a level of confidence of 95%.

TEST REPORT

Intertek Report No. : SZHH01152706-003S5

10 OCCUPIED BANDWIDTH

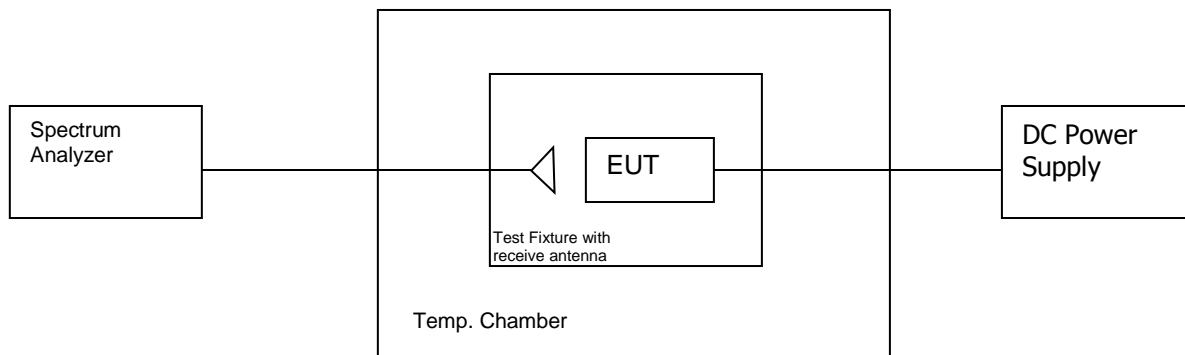
10.1 TEST METHOD AND SUMMARY

Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.4
Application :	All transmitter

10.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

10.3 TEST SETUP



TEST REPORT

Intertek Report No. : SZHH01152706-003S5

10.4 TEST RESULT

Test Conditions		Occupied Bandwidth(kHz)	Flow (MHz)	F _{high} (MHz)
Nominal frequency stated by the manufacturer: 27.143MHz				
T _{nom} : 25.0°C H _{nom} : 50.0%	V _{DC nom} DC 3.0V	16.400000	27.134800	27.151200
T _{min} : -20°C H _{min} : 0 %	V _{DC max} DC 3.0V	16.400500	27.134799	27.151201
	V _{DC min} DC 2.4V	16.400530	27.134799	27.151201
T _{max} : +55°C H _{max} : 50.0 %	V _{DC max} DC 3.0V	16.400320	27.134800	27.151200
	V _{DC min} DC 2.4V	16.400220	27.134800	27.151200

Maximum Occupied Bandwidth 16.400530 (kHz)

		Frequency (MHz)	Within Assigned Frequency Band
Lowest F _{LM}	F _{LM}	27.134799	Complied
Highest F _{HM}	F _{HM}	27.151201	Complied

Note:

Test environment Normal or extreme conditions
Centre Frequency The highest or lowest operating frequency as declared by the manufacturer and any other frequencies used in the test case
Occupied Bandwidth The value measured with the spectrum analyzer
Maximum Occupied Bandwidth Highest measured OBW value or if the measurement is only performed at normal temperature conditions, the upper and lower frequency error results have to be added and subtracted to measured OBW to calculate the Maximum Occupied Bandwidth

Measurement uncertainty is ± 5% ppm at a level of confidence of 95%.

11 DUTY CYCLE

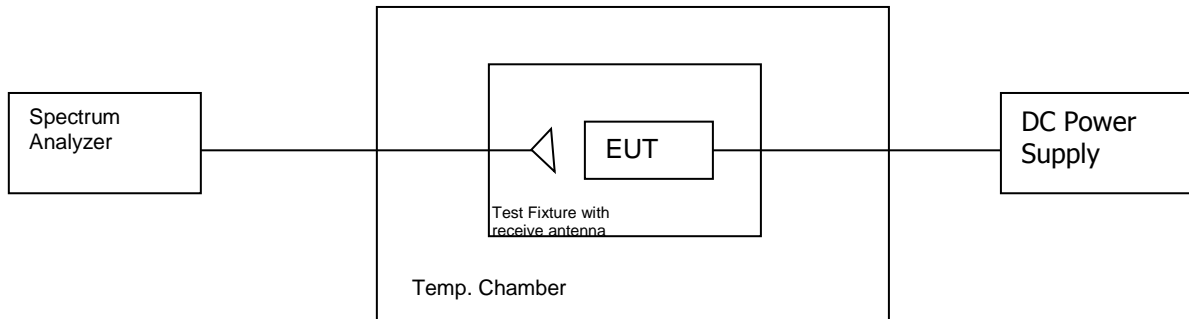
11.1 TEST METHOD AND SUMMARY

Basic Standard :	ETSI EN 300 220-2 V3.1.1 (2017-02)
Clause :	4.3.3
Application :	All transmitter

11.2 EQUIPMENT LIST

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ056-03	Spectrum Analyzer	R&S	FSP 30	14-Jun-16	14-Jun-17
SZ016-02	Programmable Temperature & Humidity Chamber	DongZhiXun	WGD/SJ-415-A	9-Mar-17	9-Mar-18
SZ006-06	DC Power Supply	Guwei	GPR-6030D	14-Mar-17	14-Sep-17

11.3 TEST SETUP



11.4 TEST RESULT

Test Conditions: Temperature 25.8°C; Humidity 62.0%

- No requirement for Frequency Band on 26.957-27.283MHz refer to Annex B, Table B.1 and Band No. A or C of harmonised standard.

EXHIBIT 3

**TEST RESULT
OF
EMC COMPLIANCE MEASUREMENTS**

12 EMC EMISSION TEST

12.1 TEST METHOD AND SUMMARY

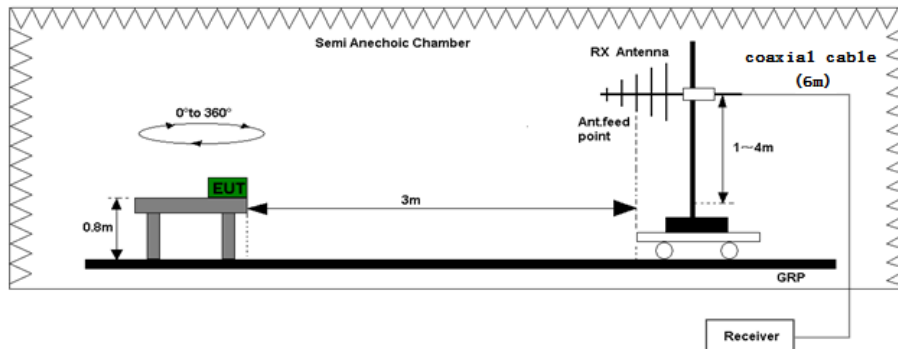
Basic Standard :	EN55032: 2015
Test :	Radiated Emission
Classification :	Class B
Port :	Enclosure Port of Ancillary Equipment

12.2 RADIATED EMISSION TEST

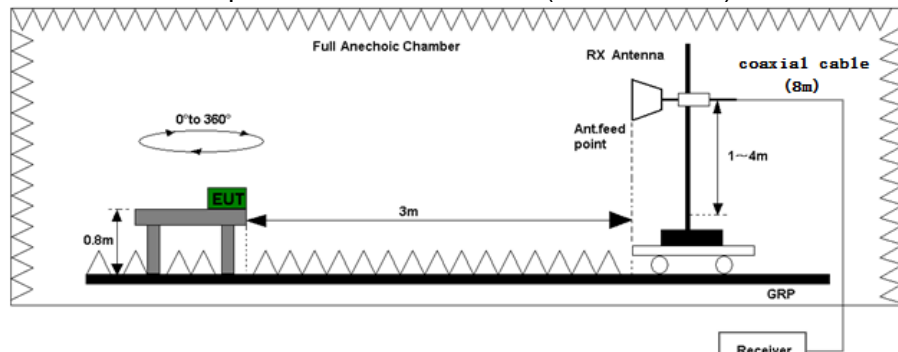
12.2.1 TEST EQUIPMENT

Equipment No.	Equipment	Manufacturer	Model No.	Calibration Date	Next Calibration Due Date
SZ185-01	EMI Receiver	R&S	ESCI	23-Jan-16	23-Jan-17
SZ061-03	BiConiLog Antenna	ETS	3142C	14-Jun-16	14-Jun-17
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	16-Apr-16	16-Apr-18
SZ062-04	RF Cable	RADIALL	RG 213U	7-Apr-16	7-Oct-16
SZ062-13	RF Cable	Habia	0.026-26.5GHz	7-Apr-16	7-Oct-16

12.2.2 TEST SETUP



Test set-up of radiated disturbance (30MHz-1GHz)



Test set-up of radiated disturbance (above 1GHz)

12.2.3 TEST RESULT

Worst-case Operating Mode: Running (Motor)

Polarization	Frequency (MHz)	Net at 3m (dBµV/m)	Calculated Net at 10m (dBµV/m)	Limit at 10m (dBµV/m)	Margin (dB)
H	81.410	22.7	12.2	30.0	-17.8
H	162.890	21.4	10.9	30.0	-19.1
H	528.580	32.2	21.7	37.0	-15.3
V	162.890	27.8	17.3	30.0	-12.7
V	406.845	24.9	14.4	37.0	-22.6
V	434.490	23.1	12.6	37.0	-24.4

No emissions significantly above equipment noise floor.

Notes:

1. Quasi-Peak Detector Data
2. Negative sign (-) in the margin column signify levels below the limit
3. Frequency range scanned: 30 MHz to 1000 MHz
4. Only emissions significantly above equipment noise floor are reported
5. Measurement Uncertainty: ±4.8dB.

12.2.4 MEASUREMENT UNCERTAINTY

Measurement Uncertainties: ± 4.8dB. The measured result is above the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the specification limit.

13 ELECTROSTATIC DISCHARGE

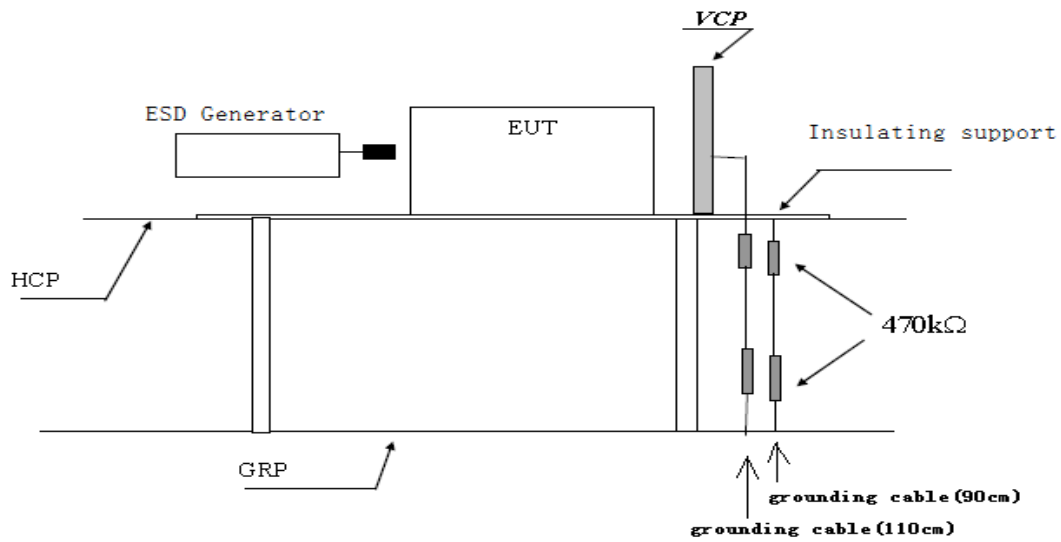
13.1 TEST METHOD AND SUMMARY

Basic Standard :		EN 61000-4-2: 2009
Port :		Enclosure
Required Performance Criterion :		TT & TR
Level :		± 2.0, ± 4.0, ±8.0 kV (Air Discharge) ± 2.0, ±4.0 kV (Contact Discharge) ± 2.0, ±4.0 kV (Indirect Contact Discharge)
No. of Discharge(s) :		Minimum of 10 Discharges per Each Polarity
Time Between Each Discharge :		1 second
Test Mode :		TX : Stand-by and Transmission Modes, Power off RX : Stand-by and Operating (Motor), Power off
Test Setup :		Table-top
Temperature :		27.1°C
Relative Humidity :		42.3%
Test of Post-installation :		N/A
Test Point	Air Discharge:	All insulated enclosure and seams
		All the points where contact discharge cannot be applied
	Contact:	All conductive surfaces of the EUT
	HCP:	All sides of the EUT
	VCP:	Four faces of the EUT

13.2 TEST EQUIPMENT

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ189-03	ESD Simulator	Teseq	NSG 435	9-Nov-16	9-Nov-17

13.3 TEST SETUP



Test set-up of electrostatic discharge

13.4 TEST RESULT

13.4.1 TEST RESULT

Discharge Type	Applied Voltage	Result (Pursuant to ETSI EN 301 489-3 Criterion TT & TR)
Contact Discharge	$\pm 2.0, \pm 4\text{kV}$	Complied
Air Discharge	$\pm 2, \pm 4, \pm 8\text{kV}$	Complied
Indirect HCP Discharge	$\pm 2.0, \pm 4\text{kV}$	Complied
Indirect VCP Discharge	$\pm 2.0, \pm 4\text{kV}$	Complied

13.4.2 ADDITIONAL RESULT INFORMATION

No observable change.

14 RADIO FREQUENCY ELECTROMAGNETIC FIELD

14.1 TEST METHOD AND SUMMARY

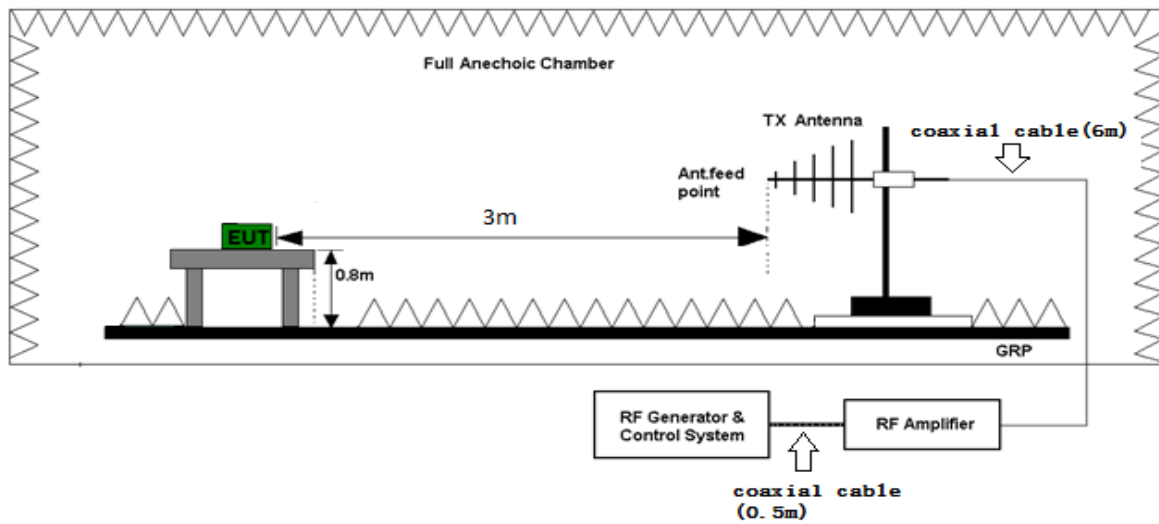
Basic Standard :	EN 61000-4-3: 2006 + A1: 2008 + A2: 2010
Port :	Enclosure
Required Performance Criterion :	CT & CR
Level :	3.0 V/m (rms)
Test Modulation :	1kHz, 80% AM
Frequency :	80 MHz to 6000 MHz
Dwell Time :	1s
Frequency Step :	10%
Temperature :	23.8°C
Relative Humidity :	54.0%
Test Facility :	Full Anechoic Chamber
Antenna Polarization :	Horizontal and Vertical
Type of Antenna :	Broadband Antenna
Test Distance :	3m
Test Mode :	TX : Stand-by and Transmission Modes, Power off RX : Stand-by and Operating (Motor), Power off
Test Setup :	Table-top

14.2 TEST EQUIPMENT

* The Equipment would be verified together with the test system before testing.

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ061-04	BiConiLog Antenna	ETS	3142C	27-Jun-16	27-Dec-17
EM061-06	Stacked double log-Per. Antenna	SCHWARZBECK	STLP 9149	16-Oct-15	16-Oct-17
SZ180-01	Signal Generator	R&S	SML03	23-May-17	23-May-18
SZ180-15	Signal Generator	R&S	SMB 100A	27-Oct-16	27-Oct-17
SZ181-01	Amplifier	PRANA	AP32 MT215	9-Feb-17	9-Feb-18
SZ181-02	Power Amplifier	MILMEGA	AS0825-35	23-May-17	23-May-18
SZ190-07	RF Amplifier	AMETEK	AS0860-75/45	24-Mar-17	24-Mar-18
SZ182-01	RF Power Meter	BOONTON	4232A	9-Feb-17	9-Feb-18
SZ188-02	Anechoic Chamber	ETS	RFD-F/A-100	8-Nov-16	8-Nov-17
SZ062-02	RF Cable	RADIALL	RG 213U(6M)	8-Jan-17	8-Jan-18
SZ186-01	Field Probe	ETS	HI-6105	31-Mar-17	31-Mar-18
SZ070-05	Directional Coupler	Agilent	87300C	9-Feb-17	9-Feb-18

14.3 TEST SETUP



Test set-up of Immunity to Radiated Electric Fields

14.4 TEST RESULT

14.4.1 TEST RESULT

Frequency (MHz)	Exposed Side	Result (Pursuant to ETSI EN 301 489-3 Criterion CT & CR)
80 to 6000	Front	Complied
80 to 6000	Left	Complied
80 to 6000	Rear	Complied
80 to 6000	Right	Complied

14.4.2 ADDITIONAL RESULT INFORMATION

No observable change.

EXHIBIT 4

PHOTOS OF EUT

15. EUT PHOTOS

External Photo



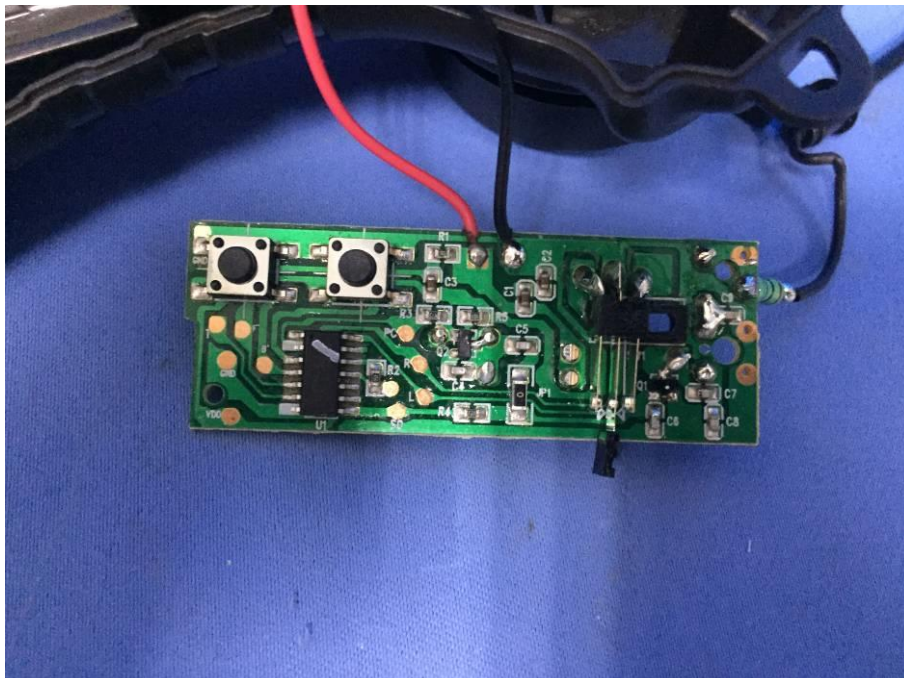
External Photo



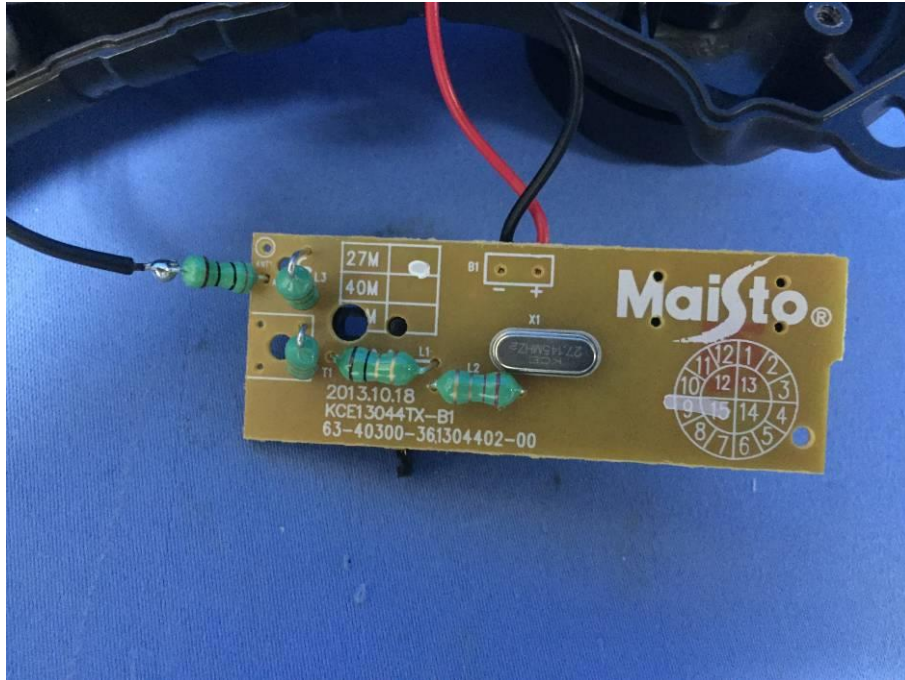
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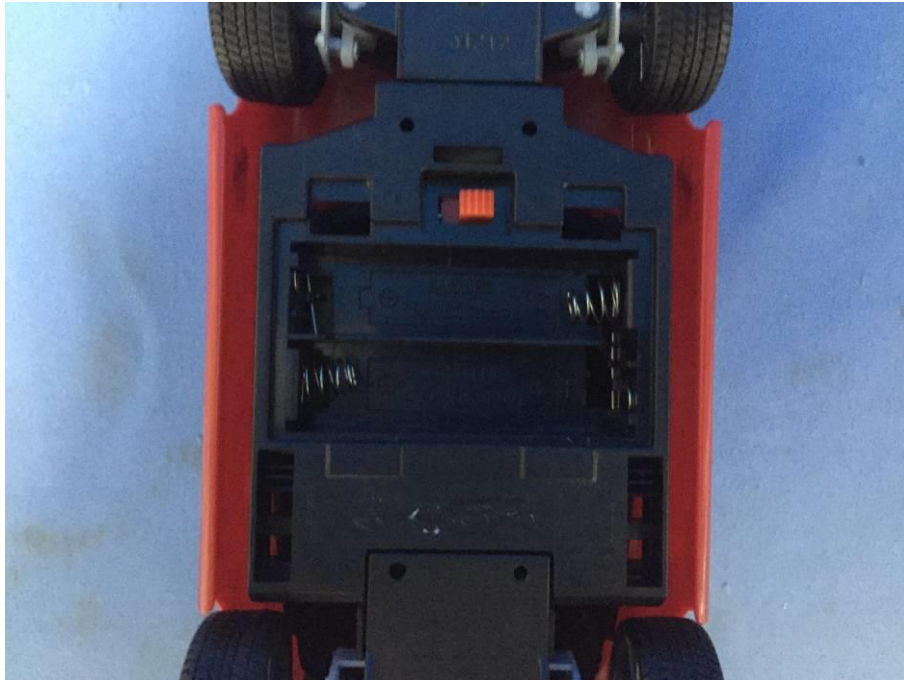
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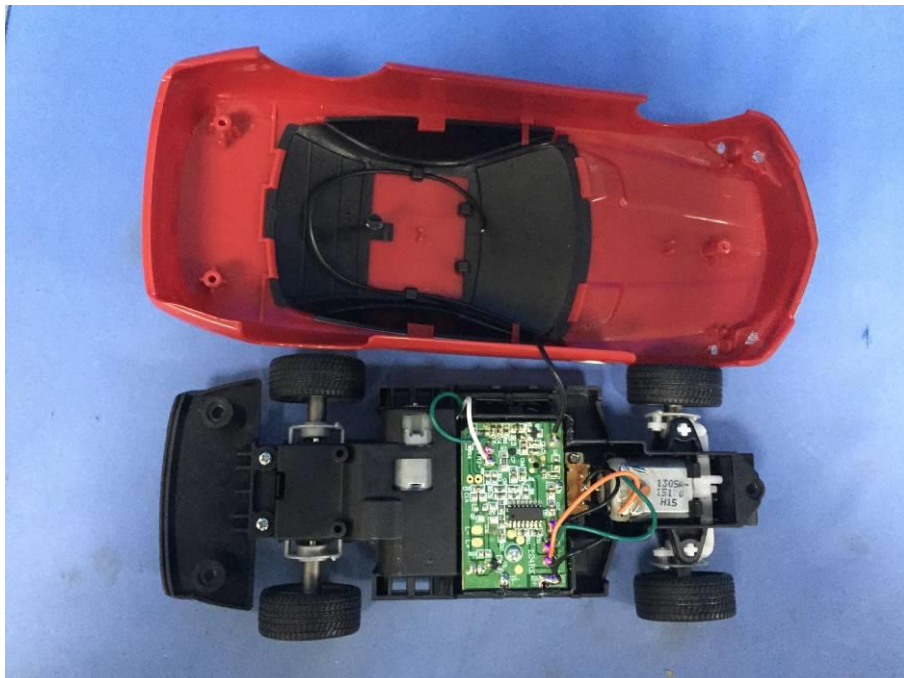
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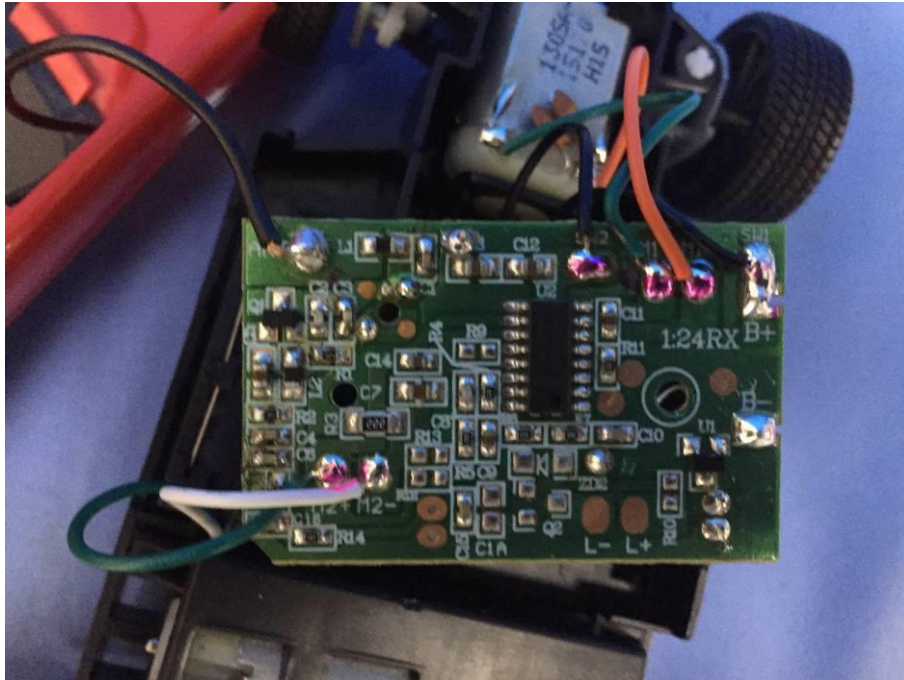
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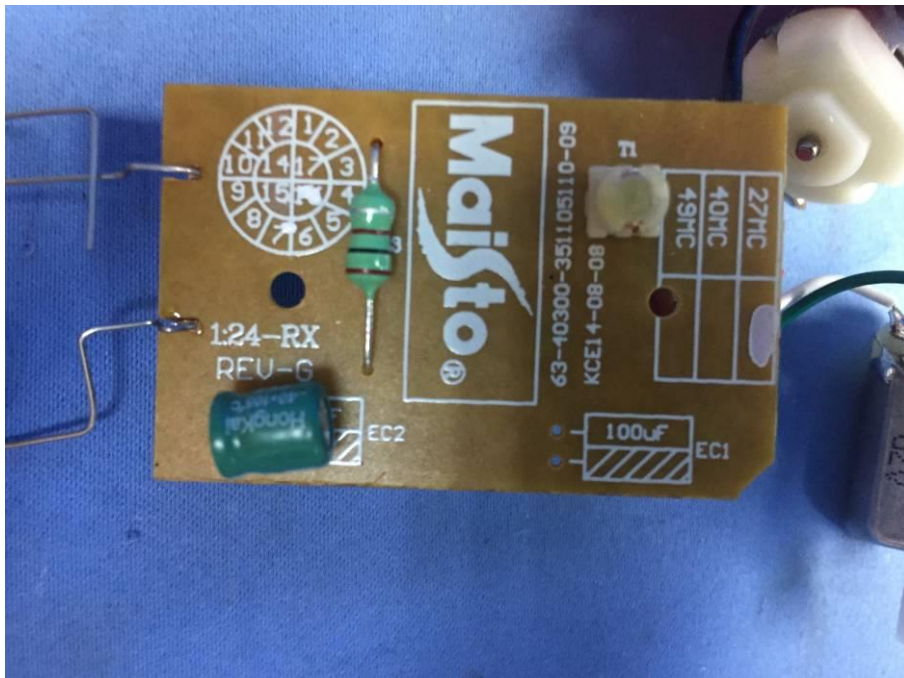
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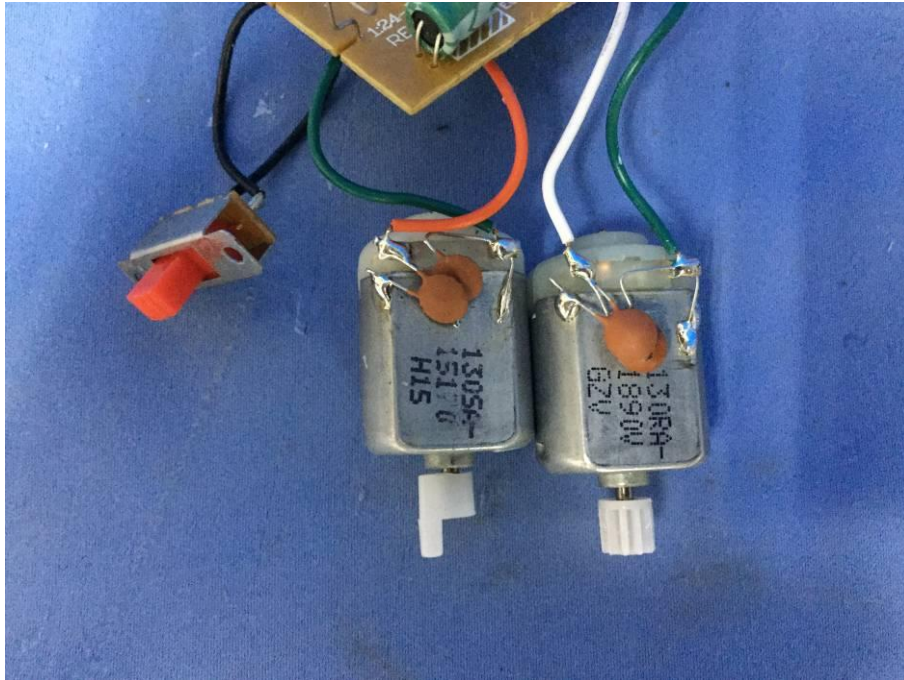
Internal Photo



Internal Photo



Internal Photo



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