



EMC TEST REPORT

On Behalf of

SHENZHEN FEIJIADA TECHNOLOGY CO., LTD

REMOTE CONTROL AIRCRAFTSERIES

Model No.: See page 6 for models

Prepared for : SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK,
Address : NO. 450 BULONG ROAD, BANTIAN ST., LONGGANG DISTRICT
SHENZHEN CHINA (MAINLAND)

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
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TEST REPORT DECLARATION

Applicant : SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK, NO. 450
Address : BULONG ROAD, BANTIAN ST., LONGGANG DISTRICT SHENZHEN CHINA
(MAINLAND)
Manufacturer : SHENZHEN FEIJIADA TECHNOLOGY CO., LTD
428, BLDG. 2, JINFANGHUA E-COMMERCE INDUSTRIAL PARK, NO. 450
Address : BULONG ROAD, BANTIAN ST., LONGGANG DISTRICT SHENZHEN CHINA
(MAINLAND)
EUT Description : REMOTE CONTROL AIRCRAFT SERIES
(A) Model No. : See page 6 for models
(B) Trademark : N/A

Measurement Standard Used:

ETSI EN 301 489-1 V2.2.3:2019

ETSI EN 301 489-3 V2.1.1:2019

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the EN 301 489-1 and EN 301 489-3 requirements.

Tested by (name + signature).....:

Lucas Pang
Project Engineer

Approved by (name + signature).....:

Simple Guan
Project Manager

Date of issue.....:

September 25, 2020



Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 25, 2020	Initial released Issue	Lucas Pang

1. General Information

EUT Name : REMOTE CONTROL AIRCRAFTSERIES

Trade Name : N/A

Model No. : JD-22, JD-22S, JD-23, JD-23S, JD-25, JD-25S, JD-26, JD-26S, JD-27, JD-27S, JD-28, JD-28S, JD-29, JD-29S, JD-30, JD-30S, E020, E021, E021S, E022, E022S, E38, E58, E58 PRO, E61, E61H, E61HW, E65H, E65HW, E511, E511S, E520, E520S, E520S PRO, E530, E530S, E68, E69, E610, E540, E540S, EX5 PRO, EX6, EX7, FX1, FX2, FX10, F111, F40, F41, F540, F540S, JY025, JY026, JY028, JY029, S161, S162, S163, S165, S166, S167, S168, S169, S171, S172, S173, S175, S176, S177, S178, S179, S186, S188, S189, S199

DIFF. : There is no difference except for the model name. So all the test were performed on the model EX5

Power supply : DC 6V by battery

2.4G Technology

Operation frequency : 2405MHz -2475MHz

Modulation : GFSK

Number of channels : 71

Channel spacing : 1MHz

Antenna Type : Internal Antenna, max gain 3.8dBi.

Software version : 6.SJ-297L+PA V3.0

Hardware version : 6.SJ-297L+PA V3.0

Sample Type : Prototype production

1.1. Accessories of Device (EUT)

Accessories1 : N/A
Manufacturer : N/A
Model : N/A
Input : N/A
Output : N/A

1.2. Ancillary Equipment Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1	/	/	/	/	/

1.3. Test Lab Information

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

2. Summary of test

2.1. Test Standard Description

ETSI EN 301 489-1 V2.2.3:2019 Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

ETSI EN 301 489-3 V2.1.1:2019 Electro Magnetic Compatibility (EMC) standard for Radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

2.2. Performance criteria description

According to EN 301489 -3 standard, the general performance criteria as following:

performance criterion A applies for immunity tests with phenomena of a continuous nature;

performance criterion B applies for immunity tests with phenomena of a transient nature.

NOTE:

Whether a phenomenon is considered transient, continuous or otherwise is indicated in the test procedures for the phenomenon in ETSI EN 301 489-1 [1], clause 9.

Criterion	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

2.3. Summary of test result

No.	Test Parameter	Application	Results
EMC emission			
1	Radiated emission	Enclosure of ancillary equipment	PASS
2	Conducted emission	DC power input/output port	N/A
3	Conducted emission	AC mains input/output port	N/A
4	Harmonic Current Emissions	AC mains input port	N/A
5	Voltage Fluctuation & Flicker	AC mains input port	N/A
6	Conducted emission	Telecommunication port	N/A
Immunity			
7	RF electromagnetic field	Enclosure	PASS
8	Electrostatic Discharge	Enclosure	PASS
9	Fast transients common mode	Signal, telecommunication and control ports, DC and AC power ports	N/A
10	RF Common mode	Signal, telecommunication and control ports, DC and AC power ports	N/A
11	Transients and Surges	DC power input ports for vehicular use	N/A
12	Voltage dips and interruptions	AC mains power input ports	N/A
13	Surges, line to line and line to ground	AC mains power input ports, wired network ports	N/A
Note: N/A means this test item is not applicable for this device. Cause EUT belongs to portable Equipment, so test items reference to ETSI EN 301 489-1 V2.2.3 Clause 7.1 and 7.2			

2.4. Block Diagram of Configuration for test



2.5. Test mode

Number	Test mode	Radiated emission	Conducted emission	Harmonic Current Emissions	Voltage Fluctuation & Flicker
Mode 1	Link	※	/	/	/
	Note: 1: ※ is worst case mode. 2. EMS test items are required for all modes.				

2.6. Test Conditions

Items	Required
Temperature range	21-25℃
Humidity range	30-60%
Pressure range	86-106kPa

2.7. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Conducted Emission Test	2.74dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB	Polarize: V
	3.80dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB	Polarize: H
	4.16dB	Polarize: V
Uncertainty for radio frequency	5.4×10^{-8}	
Uncertainty for conducted RF Power	0.37dB	

2.8. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due day
Test Receiver	R&S	ESCI	101165	2020.09.02	2021.09.01
Test Receiver	R&S	ESR	1316.3003K03-102082-Wa	2020.09.02	2021.09.01
Loop Antenna	SCHWARZBECK	FMZB 1519B	000059	2019.09.07	2021.09.06
Bilog Antenna	Schwarzbeck	VULB 9168	9168-438	2019.09.07	2021.09.06
Spectrum analyzer	R&S	FSV40-N	102137	2020.09.02	2021.09.01
Spectrum analyzer	R&S	FSU	1166.1660.26	2020.09.02	2021.09.01
Amplifier	HP	HP8347A	2834A00455	2020.09.02	2021.09.01
Amplifier	Agilent	8449B	3008A02664	2020.09.02	2021.09.01
Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2019.09.07	2021.09.06
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126-466	2020.09.02	2021.09.01
L.I.S.N.#2	R&S	ENV216	101043	2020.09.02	2021.09.01
I.S.N.	FCC	FCC-TLISN-T8-02	20354	2020.09.02	2021.09.01
Pulse Limiter	Schwarzbeck	9516F	9618	2020.09.02	2021.09.01
Harmonics Flicker Analyser	Voltech	PM6000	200006700495	2020.09.02	2021.09.01
ESD Tester	HAEFELY	PESD1610	H310546	2020.09.02	2021.09.01
RF-Generator	Frankonia	CIT-10/75	12681247/2013	2020.09.02	2021.09.01
Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	2020.09.02	2021.09.01
Coupling-Decoupling Network (CDN)	CD	CDN M2/M3	2302	2020.09.02	2021.09.01
Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	2020.09.02	2021.09.01
Main Interference Simulator	3ctest	VDG-1105G	EC0171002	2020.09.02	2021.09.01
Burst Tester	3ctest	EFT-4001G	EC0461015	2020.09.02	2021.09.01
Capacitive Coupling	3ctest	EFTC	EC0441049	2020.09.02	2021.09.01
Surge CDN	3ctest	SGN-5010G	EC5591004	2020.09.02	2021.09.01
Surge Generator	3ctest	SG-5006G	EC5581006	2020.09.02	2021.09.01
Base station	Agilent	E4438C	US44271917	2020.09.02	2021.09.01
Universal Radio Communication Tester	R&S	CMU200	116785	2020.09.02	2021.09.01
Signal Generator	Agilent	N5182A	MY49060042	2020.09.02	2021.09.01
Vector Signal Generator	Agilent	E4438C	US44271917	2020.09.02	2021.09.01
Power meter	Agilent	E4419B	GB40202122	2020.09.02	2021.09.01
Power Sensor	Agilent	E9300A	MY41496625	2020.09.02	2021.09.01
RF power Amplifier	OPHIR	5225R	1045	N/A	NCR

RF power Amplifier	OPHIR	5273R	1018	N/A	NCR
Antenna	SCHWARZBECK	STLP9128E-special	STLP9128E s#139	N/A	NCR
Antenna	SCHWARZBECK	STLP9128E-special	STLP 9149 #456	N/A	NCR
CMW500	R&S	CMW500	1201.0002K50- 117239-sM	2020.09.02	2021.09.01

3. Conducted emission

3.1. Limit for AC mains port

Frequency	Quasi-Peak Level dB (μV)	Average Level dB (μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

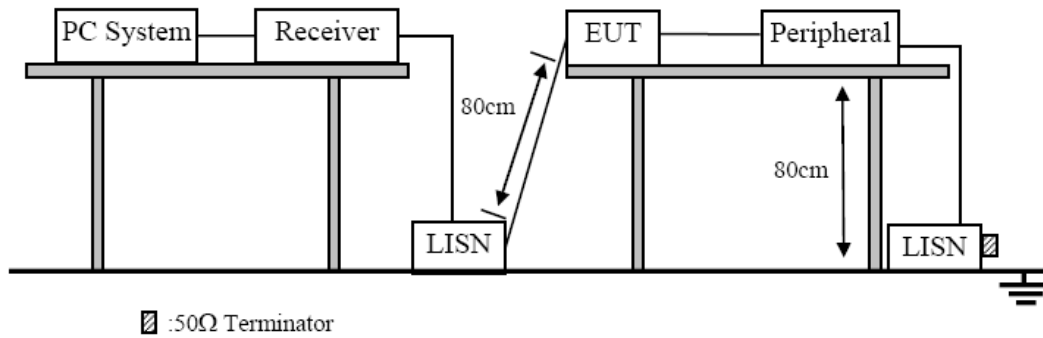
3.2. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was power charged from notebook which powered from power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.2#). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to the EN55032 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.6

3.3. Test Setup



3.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.

3.5. Test Result

The EUT is supplied by Battery, so this item does not applicable

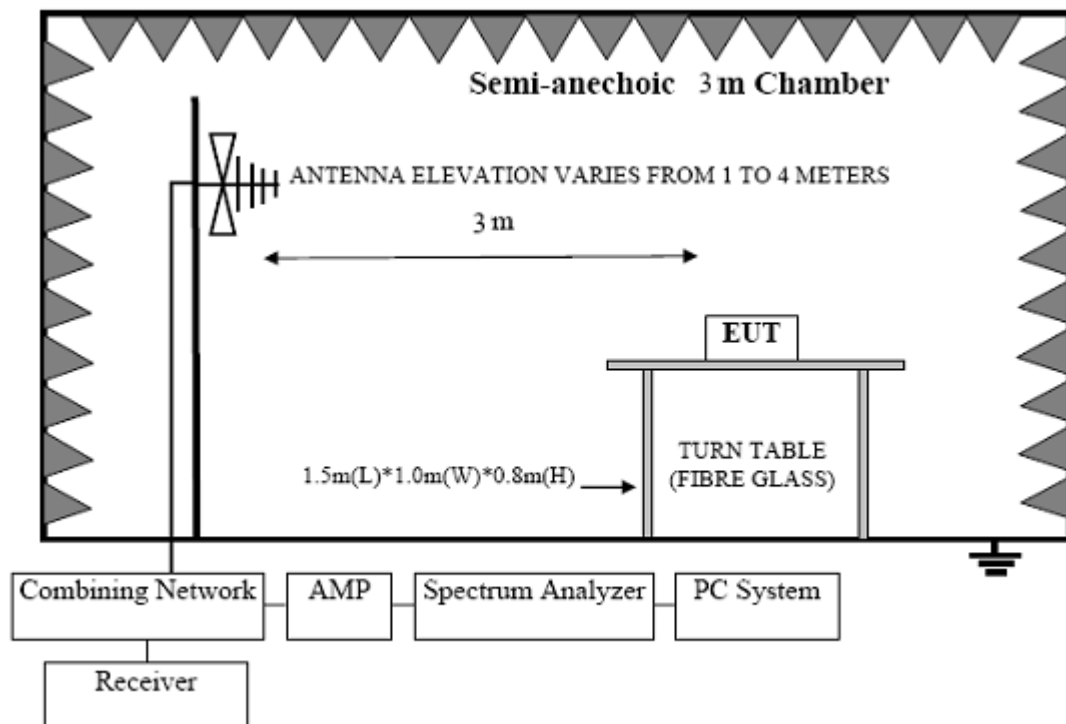
4. Radiated emission

4.1. Limit

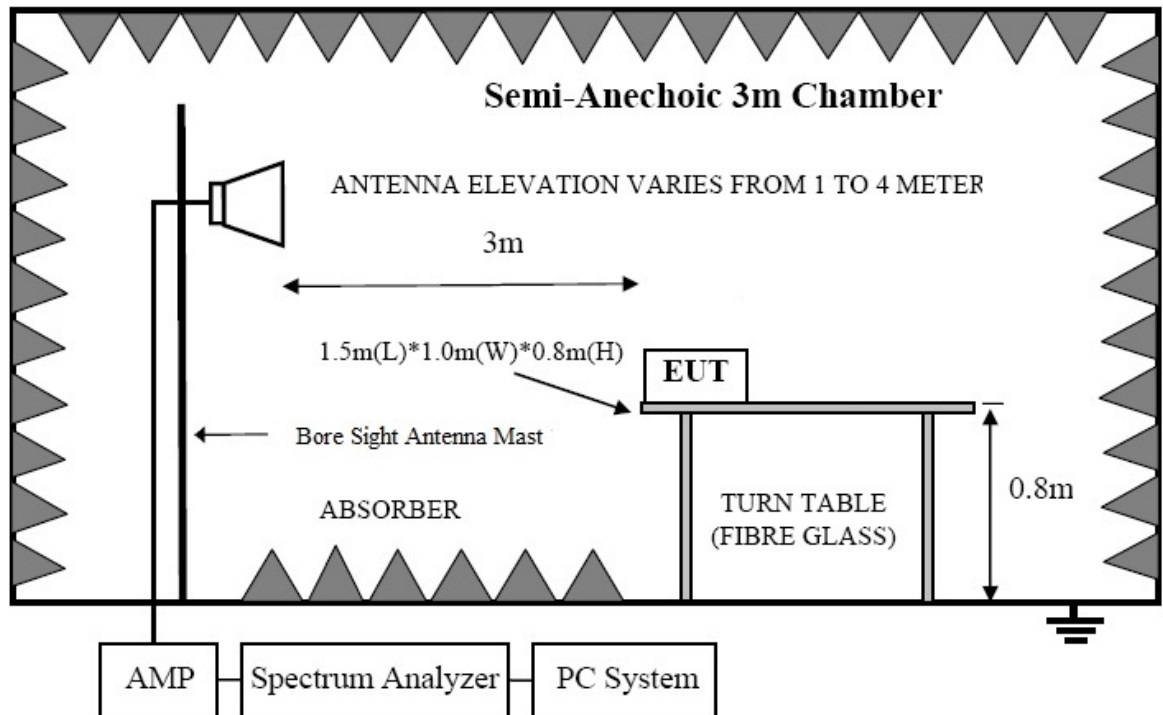
FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB μ V/m)
30~230	3	40
230~1000	3	47
1000-3000	3	Average limit:50 Peak limit:70
3000-6000	3	Average limit:54 Peak limit:74

Note: The lower limit shall apply at the transition frequencies.

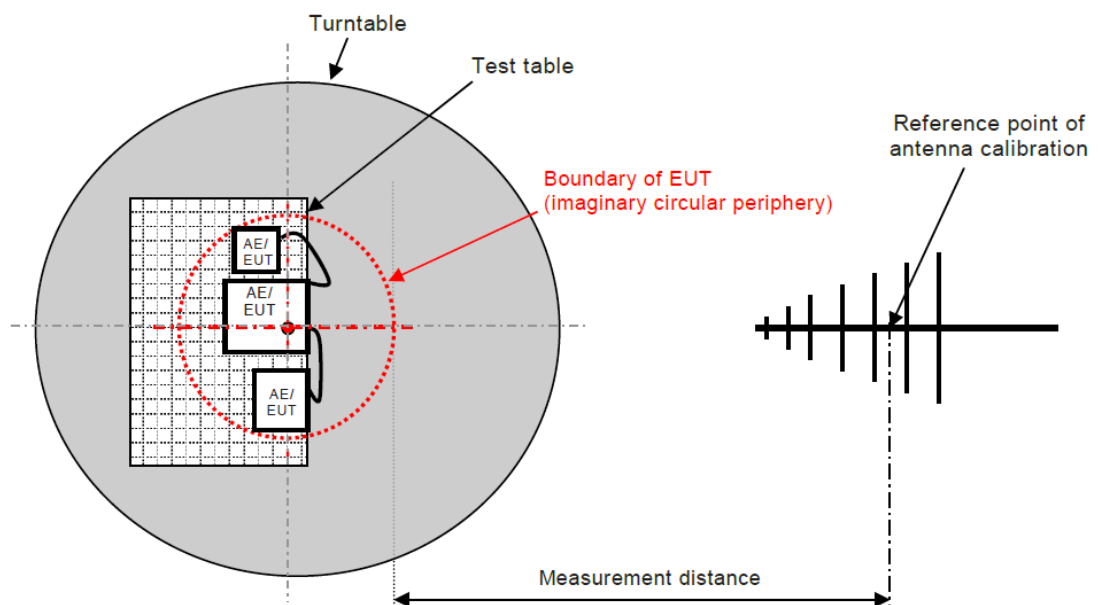
4.2. Test setup



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



For 3m distance description:



4.3. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT for below 1GHz test and 3m for above 1GHz test on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 Class B on Radiated Disturbance test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESCI) is 120 kHz for below 1GHz test. For emission above 1GHz, The Spectrum's RWB is set 1MHz and VBW 1MHz to measure Peak Level.

4.4. Operation condition of EUT

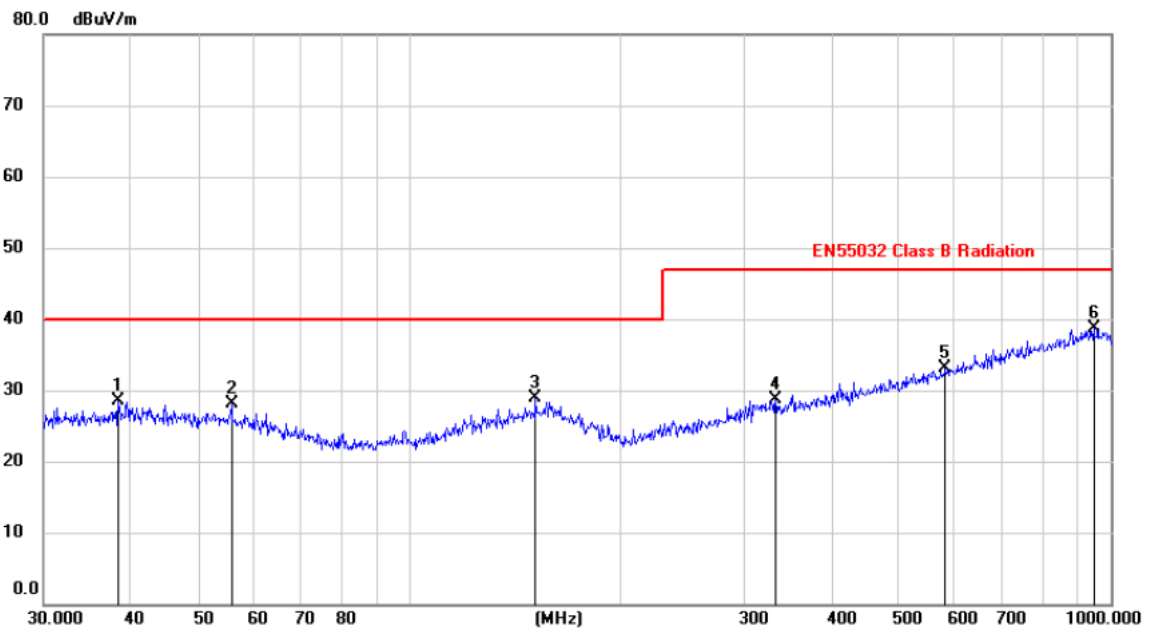
- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.

Note: Radiated emission test is only applicable to ancillary equipment not incorporated in the radio equipment and intended to be measured on a stand-alone basis, so the wireless function of EUT was closed in this test.

4.5. Test result

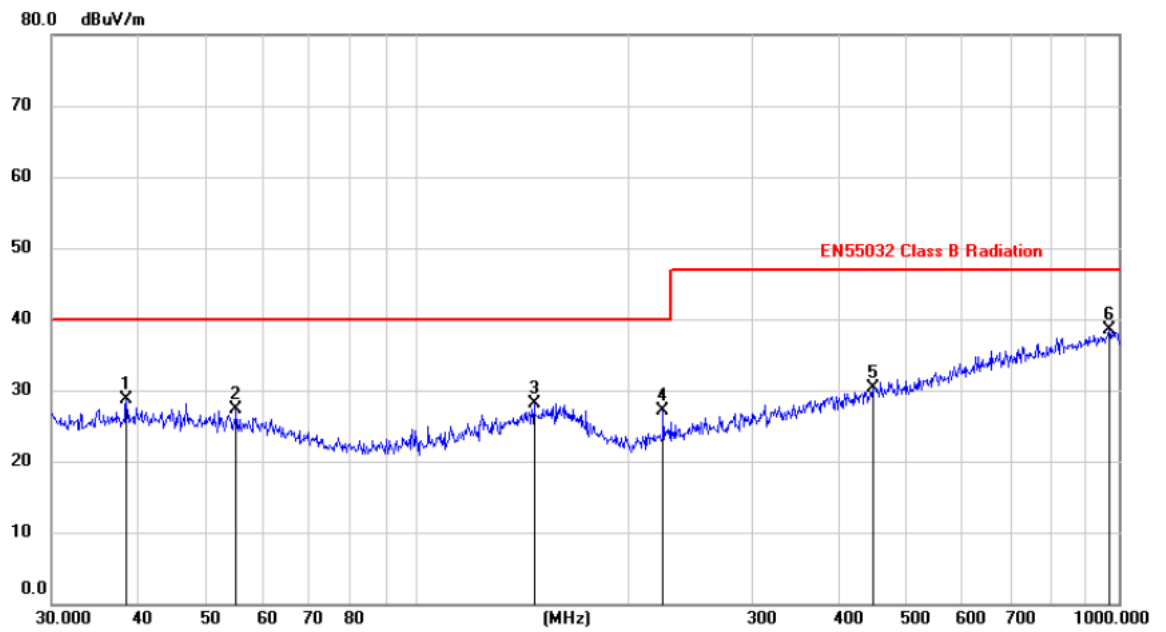
The results are shown on the next page.

Vertical



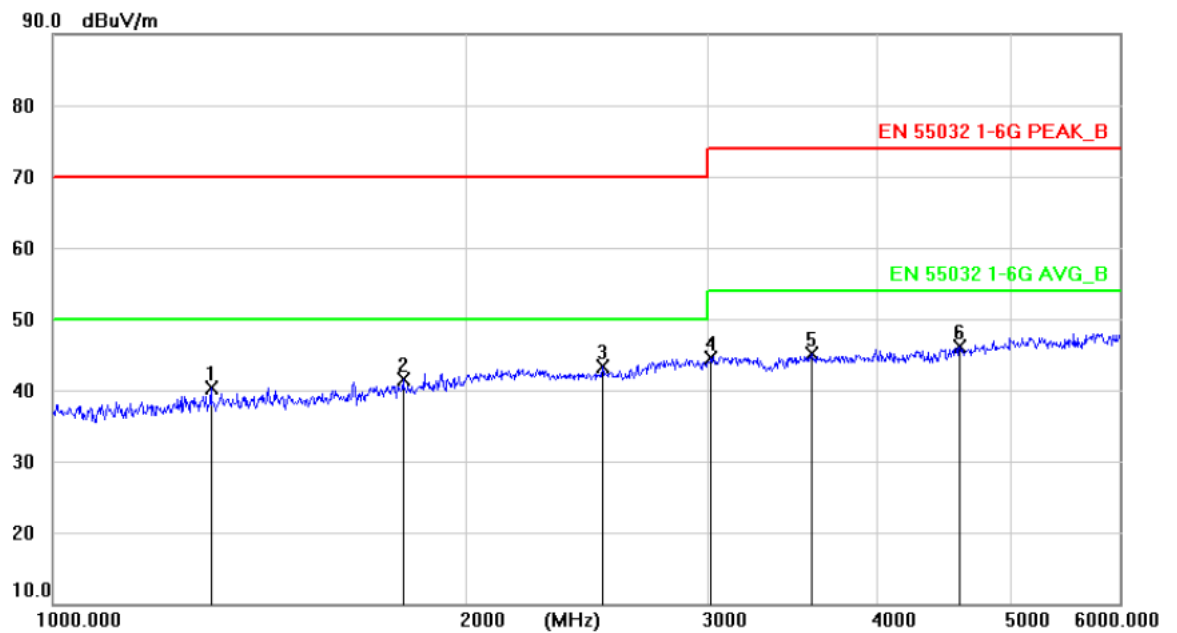
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		38.3799	14.23	14.26	28.49	40.00	-11.51	peak		
2		55.6825	14.47	13.55	28.02	40.00	-11.98	peak		
3		151.4643	13.90	14.99	28.89	40.00	-11.11	peak		
4		332.9562	13.76	14.89	28.65	47.00	-18.35	peak		
5		580.7026	13.30	19.80	33.10	47.00	-13.90	peak		
6	*	945.8544	13.90	24.78	38.68	47.00	-8.32	peak		

Horizontal



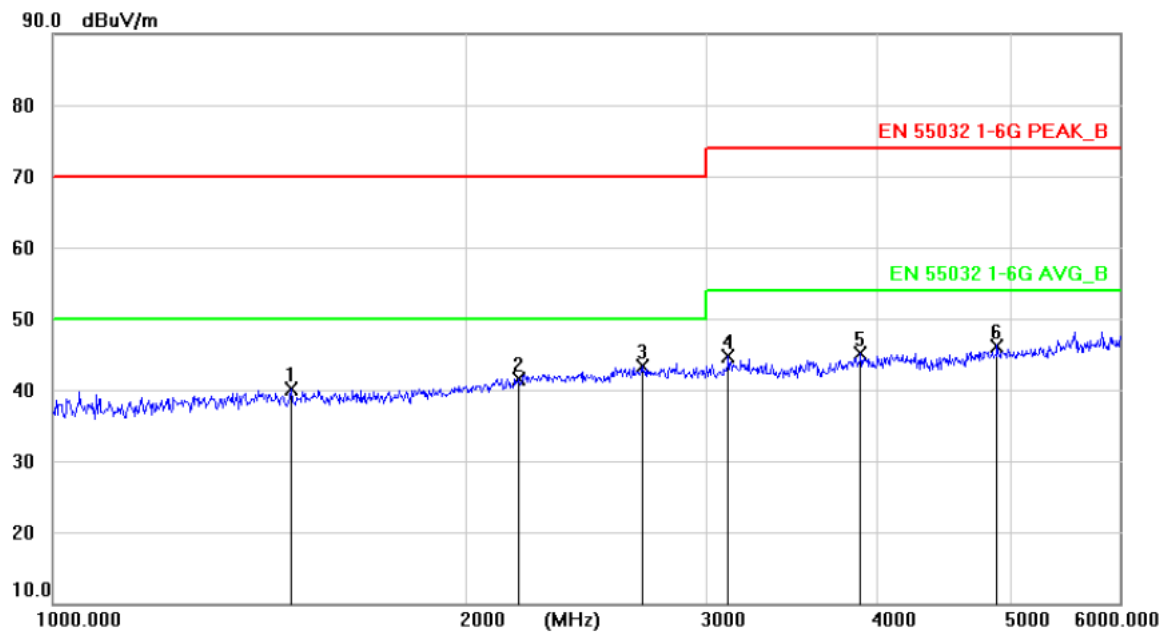
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna	Table		
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Height	Degree	Comment
1	38.4135	14.48	14.27	28.75	40.00	-11.25	peak			
2	55.0998	13.67	13.55	27.22	40.00	-12.78	peak			
3	146.4377	13.36	14.74	28.10	40.00	-11.90	peak			
4	224.5193	15.24	11.95	27.19	40.00	-12.81	peak			
5	447.0015	12.85	17.47	30.32	47.00	-16.68	peak			
6 *	969.7835	13.64	24.90	38.54	47.00	-8.46	peak			

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		1303.666	47.62	-7.32	40.30	70.00	-29.70	peak		
2		1799.839	47.98	-6.45	41.53	70.00	-28.47	peak		
3	*	2516.216	46.68	-3.34	43.34	70.00	-26.66	peak		
4		3020.782	46.68	-2.26	44.42	74.00	-29.58	peak		
5		3574.914	51.23	-6.17	45.06	74.00	-28.94	peak		
6		4585.942	49.67	-3.62	46.05	74.00	-27.95	peak		

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1491.172	47.03	-7.00	40.03	70.00	-29.97	peak		
2		2188.024	44.95	-3.43	41.52	70.00	-28.48	peak		
3	*	2688.682	46.24	-2.94	43.30	70.00	-26.70	peak		
4		3108.635	46.75	-2.06	44.69	74.00	-29.31	peak		
5		3882.044	50.57	-5.44	45.13	74.00	-28.87	peak		
6		4882.743	48.95	-2.75	46.20	74.00	-27.80	peak		

5. Harmonic current emissions

5.1. Test Procedure

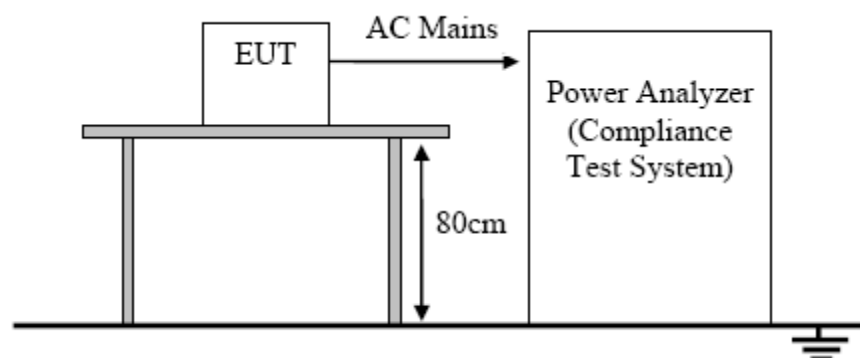
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power was connected to the power mains through a power Analyzer, let EUT worked in test mode then measure Harmonic current emissions by power analyzer and recorded data.

5.2. Limit

Limits for Class A equipment	
Harmonic order n	Maximum permissible Harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

Remark: if the EUT Power level is below 75 Watts and therefore has no defined limits.

5.3. Test setup



5.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.

5.5. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

6. Voltage fluctuations and flicker

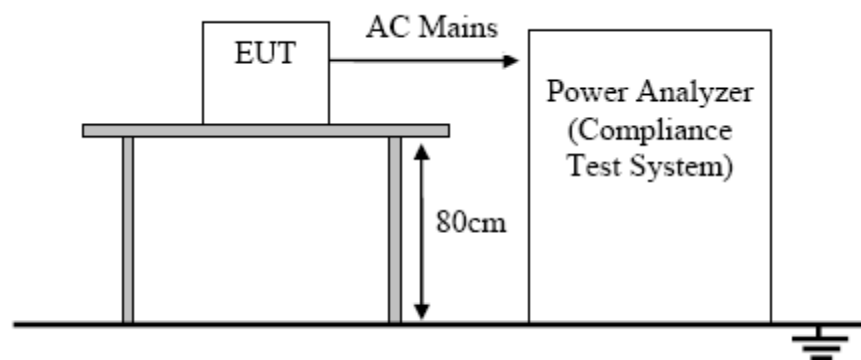
6.1. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power through a power Analyzer, let EUT worked in test mode then measure voltage fluctuations and flicker by power analyzer and recorded data.

6.2. Limit

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that dt exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3%	d_c means relative steady-state voltage change.

6.3. Test setup



6.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.

6.5. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

7. RF electromagnetic field

7.1. Test levels and Performance Criteria

Test Level		Performance Criteria
Frequency	80MHz-6GHz	A
Field Strength	3V/m measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)	
Step Size	1% increments	
Dwell time	3 Sec.	

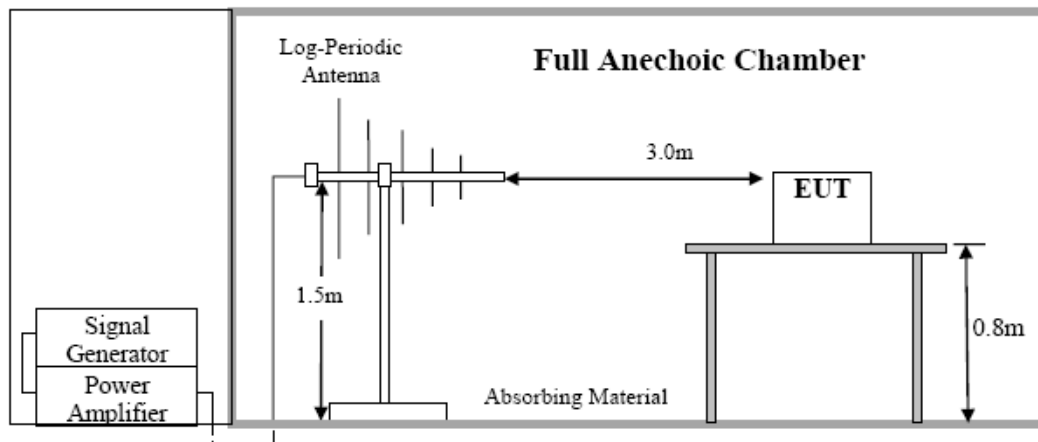
7.2. Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

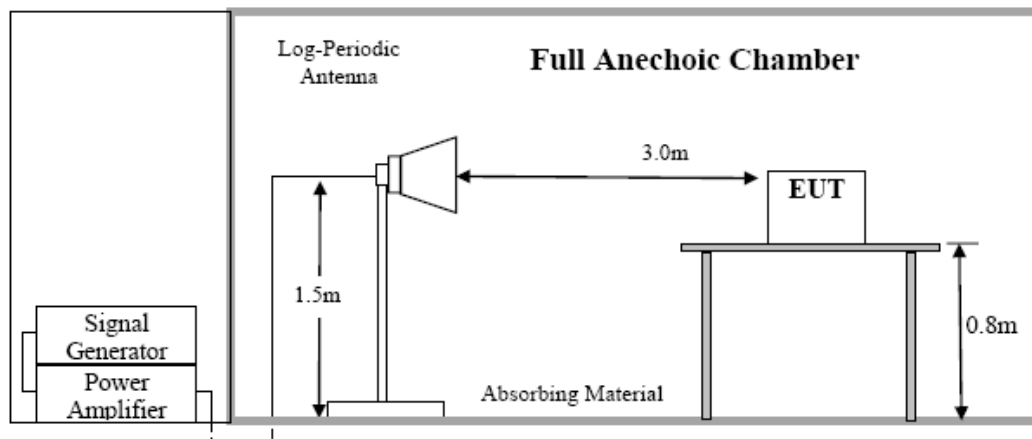
Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

7.3. Test setup

For frequency from 80MHz to 1GHz



Frequencies from 1GHz-6GHz



7.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.

7.5. Test Result

EUT Position	Antenna	R.F. Field Strength	Test frequency	Observation	Perform. Criteria	Conclusion
Front	H/V	3 V/m (rms) AM Modulated 1000Hz, 80%	80-1000MHz/ 1000-6000MHz	A	A	PASS
Right	H/V				A	PASS
Rear	H/V				A	PASS
Left	H/V				A	PASS

8. Electrostatic discharge

8.1. Test level and Performance Criteria

Test Level		Performance Criteria
Air Discharge	$\pm 2\text{kV}$, $\pm 4\text{kV}$ and $\pm 8\text{kV}$	B
Contact Discharge	$\pm 2\text{kV}$ and $\pm 4\text{kV}$	

8.2. Test Procedure

Air discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

Contact Discharge:

All the procedure was same as air discharge. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane

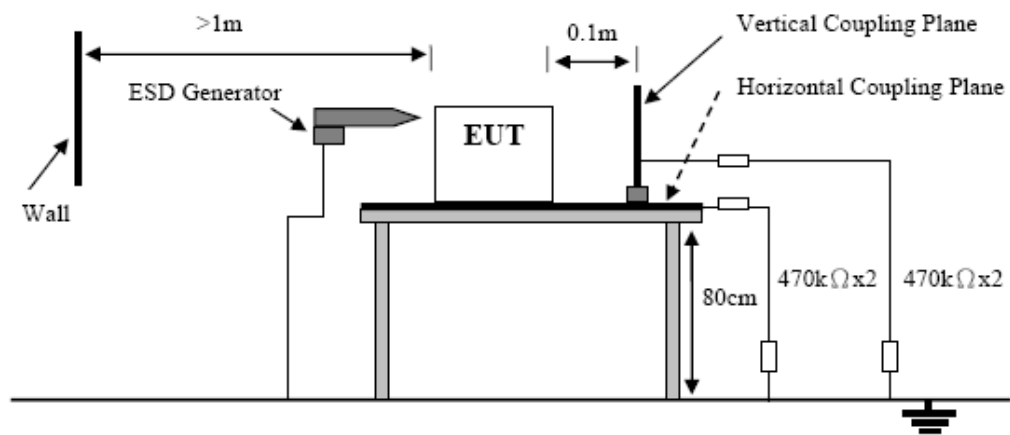
At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

8.3. Test setup



8.4. Test Result

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Observation	Perform. Criteria	Conclusion
± 2	Contact	3,4	A	B	PASS
± 4	Contact	3,4	A	B	PASS
± 2	Air	1,2	A	B	PASS
± 4	Air	1,2	A	B	PASS
± 8	Air	1,2	A	B	PASS
± 2	HCP-Bottom	Edge of the HCP	A	B	PASS
± 2	VCP-Front	Center of the VCP	A	B	PASS
± 2	VCP-Left	Center of the VCP	A	B	PASS
± 2	VCP-Back	Center of the VCP	A	B	PASS
± 2	VCP-Right	Center of the VCP	A	B	PASS
± 4	HCP-Bottom	Edge of the HCP	A	B	PASS
± 4	VCP-Front	Center of the VCP	A	B	PASS
± 4	VCP-Left	Center of the VCP	A	B	PASS
± 4	VCP-Back	Center of the VCP	A	B	PASS
± 4	VCP-Right	Center of the VCP	A	B	PASS
Operation as intend, no loss of function during test and after test.					
Discharge Points Description					
1	Slots	4	Screw		
2	Button	5	/		
3	Port	6	/		

9. Fast transients test

9.1. Lest levels and Performance Criteria

Test Level		Performance Criteria
Test voltage	1KV For AC mains Port	A
	0.5KV for telecommunication ports	
Repetition Frequency	5KHz	
Burst Duration	15ms	
Burst Period	300ms	
Inject Time(s)	120s	
Inject Method	Direct For AC mains port	
	Couple for telecommunication ports	
Inject Line	AC Mains of adapter and telecommunication ports	

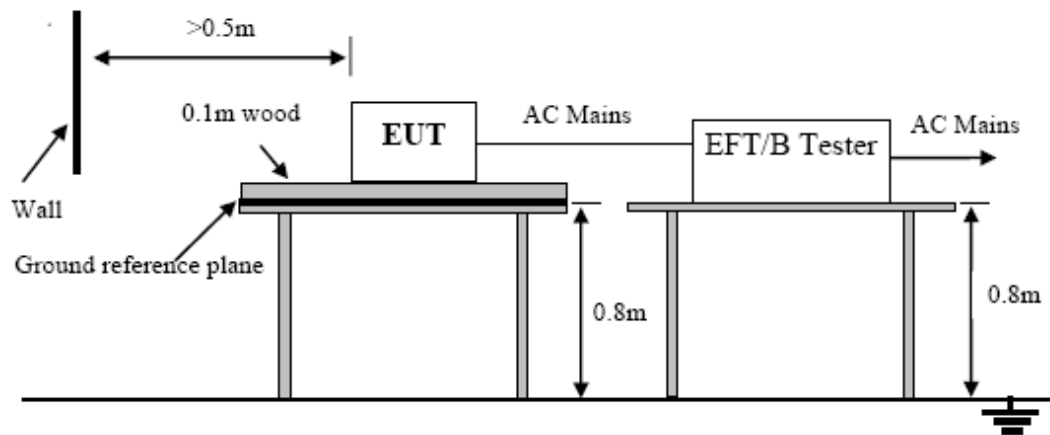
9.2. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

The EUT was powered from notebook which powered from power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

9.3. Test setup



9.4. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

10. Injection current test

10.1. Test level and Performance Criteria

Test Level		Performance Criteria
Frequency	0.15MHz to 80MHz	A
Field Strength	3V/m measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)	
Step Size	1% increments	
Dwell time	3 Sec.	

10.2. Test Procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

The disturbance signal described below is injected to EUT through CDN.

The EUT operates within its operational mode(s) under intended climatic conditions after power on.

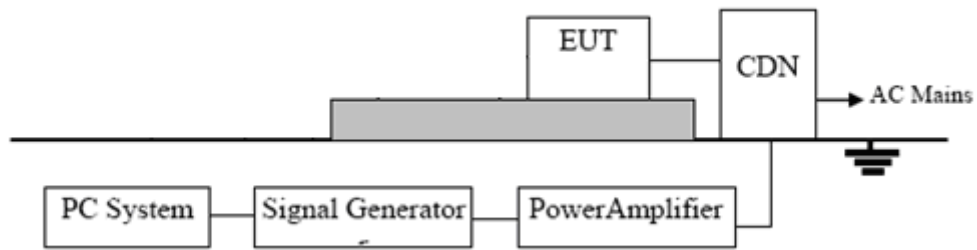
The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 400Hz sine wave.

The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

10.3. Test setup



10.4. Test result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

11. Voltage dips and interruptions

11.1. Test level and Performance Criteria

For EN301 489 Stand		
Test Level % U _T	Duration (in period)	Performance Criterion
0	0.5P	B
0	1P	B
70	25P	B
0	250P	C

11.2. Test Procedure

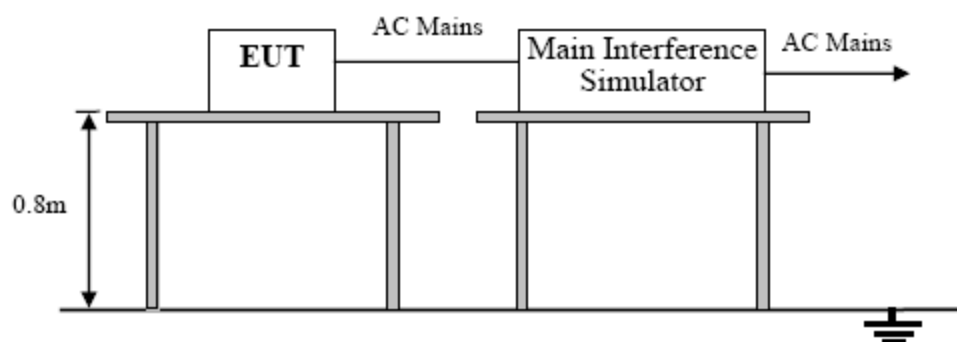
The EUT and test generator were setup as shown on Section 10.3

The interruptions are introduced at selected phase angles with specified duration.

Record any degradation of performance.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

11.3. Test setup



11.4. Test Result

Not applicable for equipment operated with PC, battery, or DC Power Supply.

12.Surge Test

12.1.Test level and Performance Criteria

Test level for AC mains ports		Performance Criterion
Line to Line	1KV	B
Line to ground	2KV	B
Test level for telecommunication ports		Performance Criterion
Line to ground	0.5KV	B

12.2.Test Procedure

Set up the EUT and test generator as shown on Section 11.2.2.

For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at pen-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.

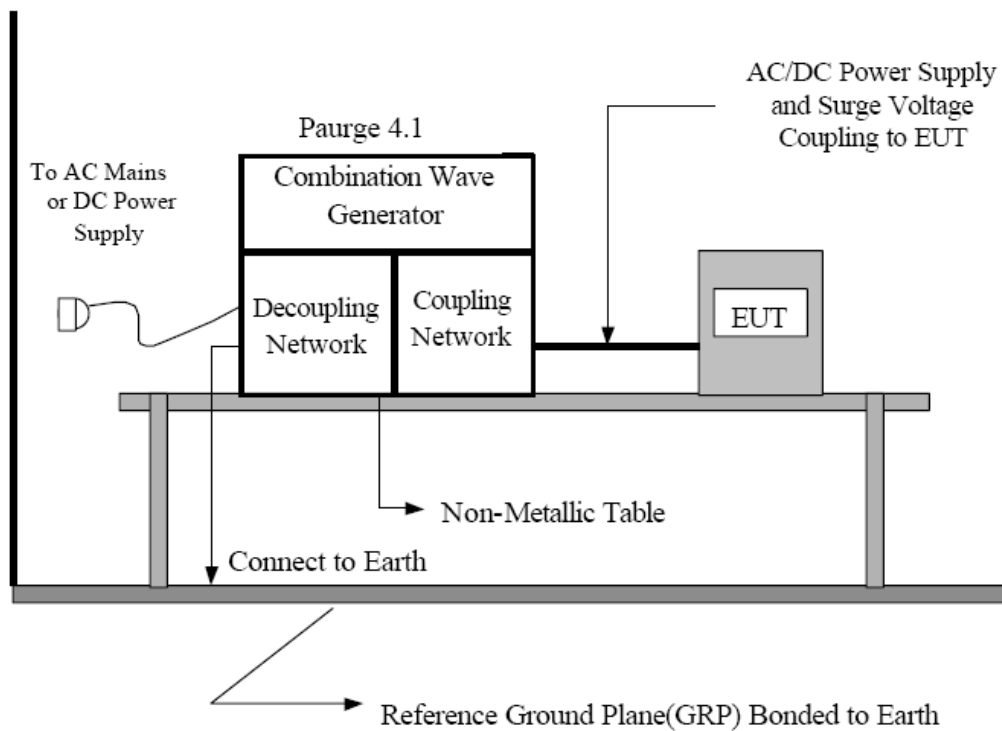
At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

Different phase angles are done individually.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

12.3. Test setup

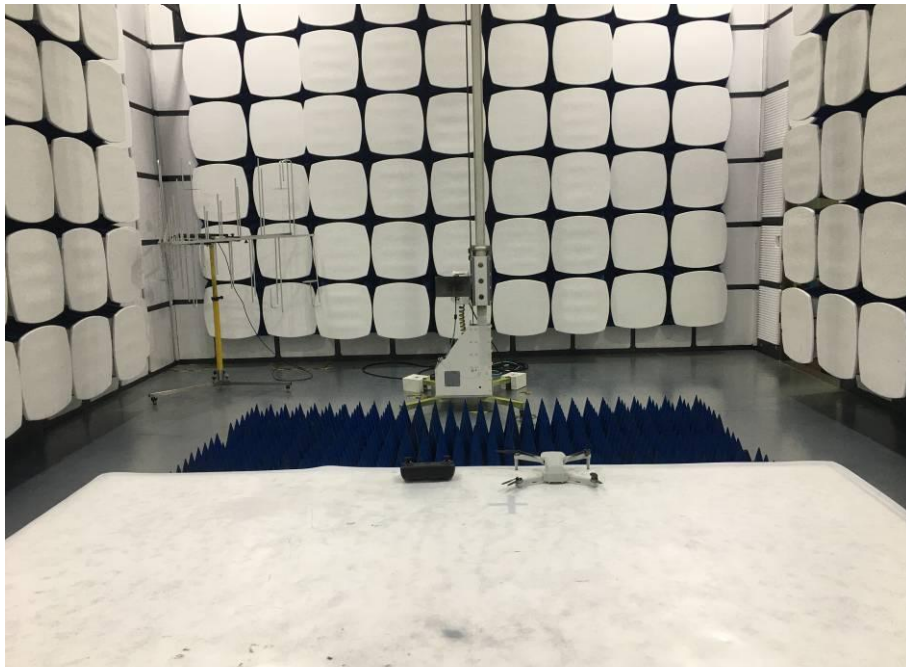
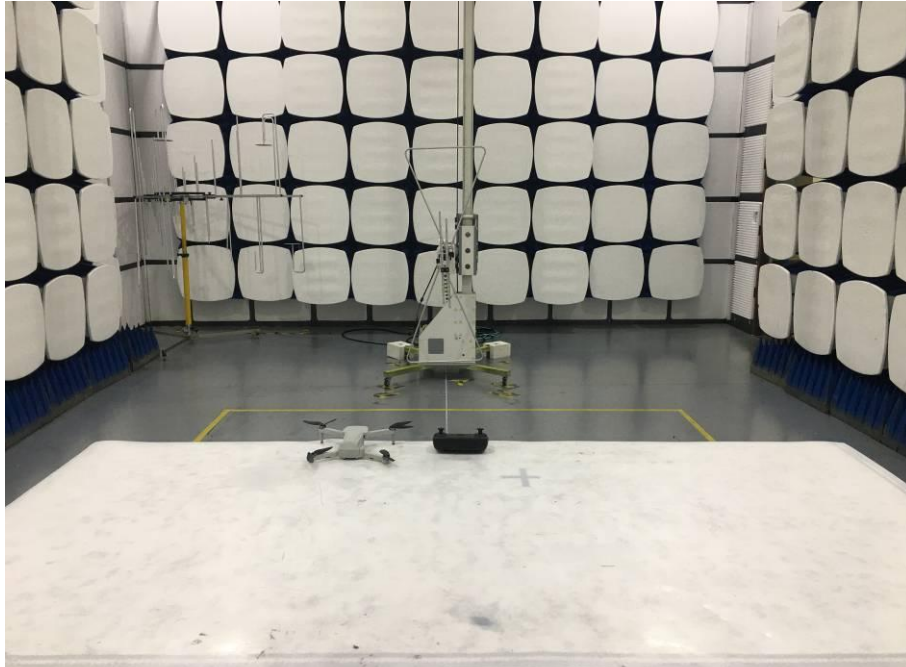


12.4. Test Result

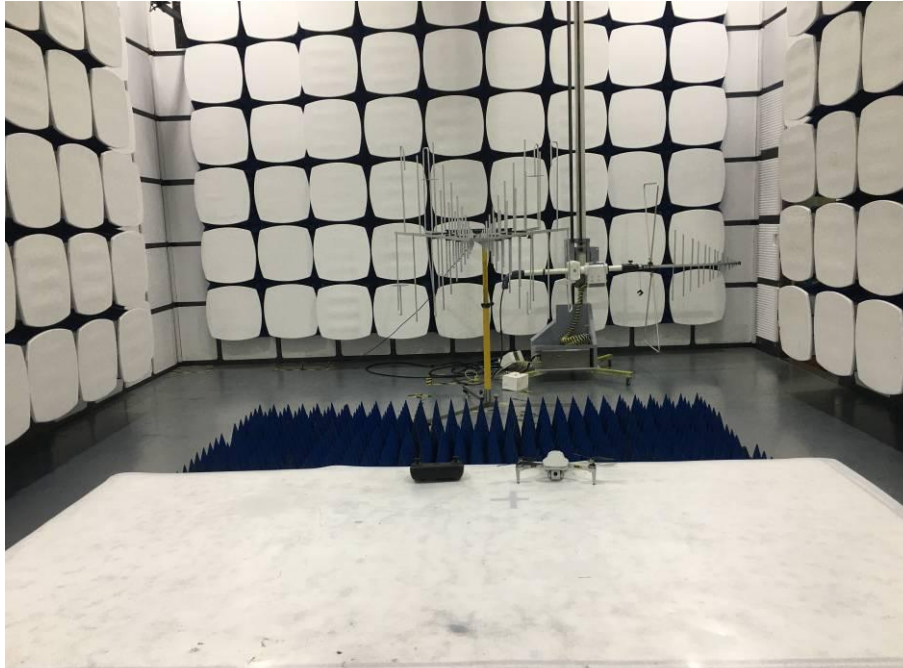
Not applicable for equipment operated with PC, battery, or DC Power Supply.

13. Photos of test setup

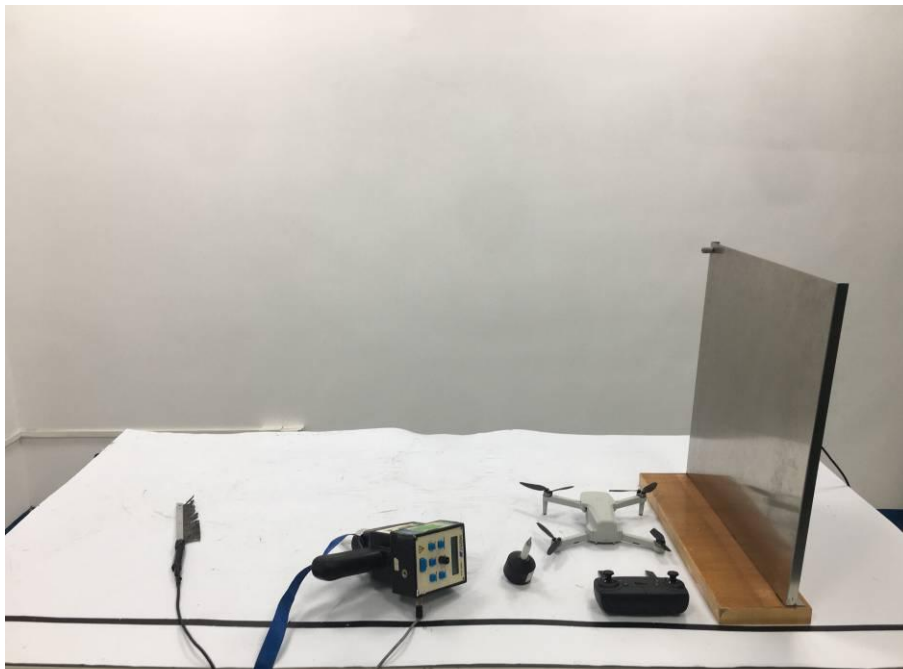
13.1. Photos of Radiated emission



13.2.Photos of RF electromagnetic field



13.3.Photos of Electrostatic discharge

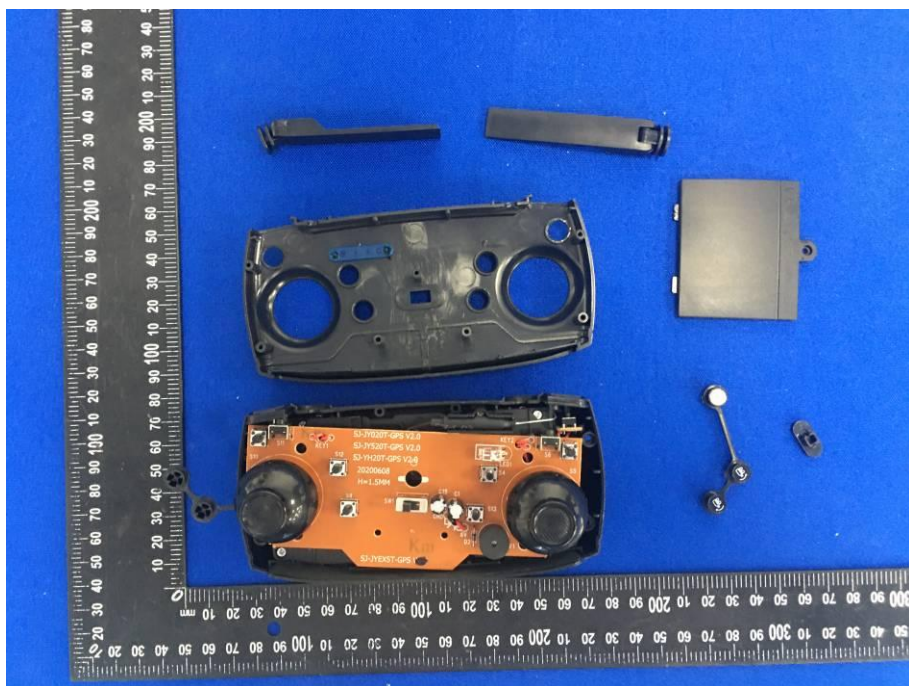


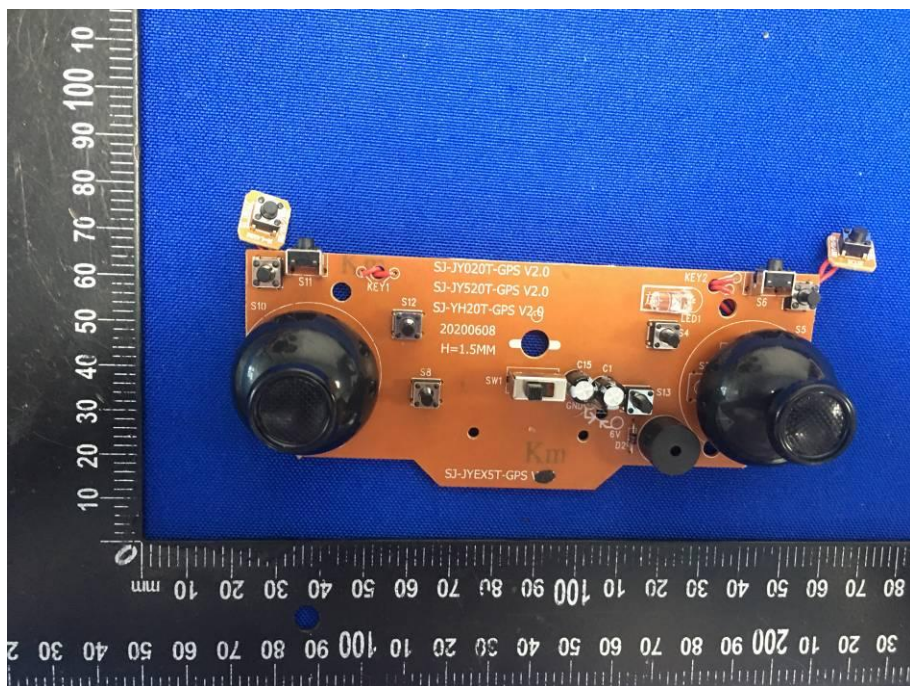
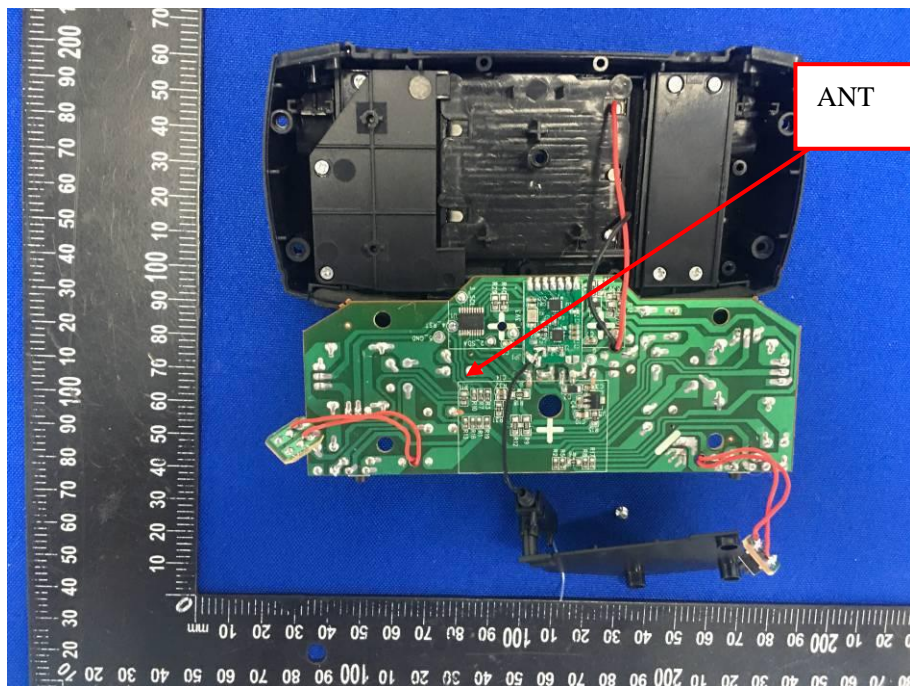
14. Photos of The EUT

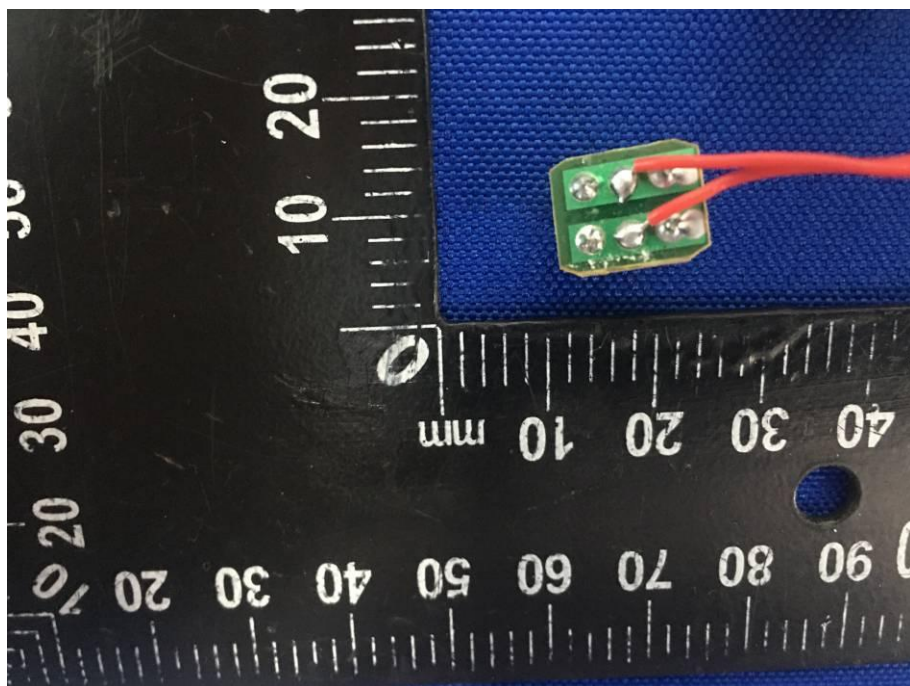
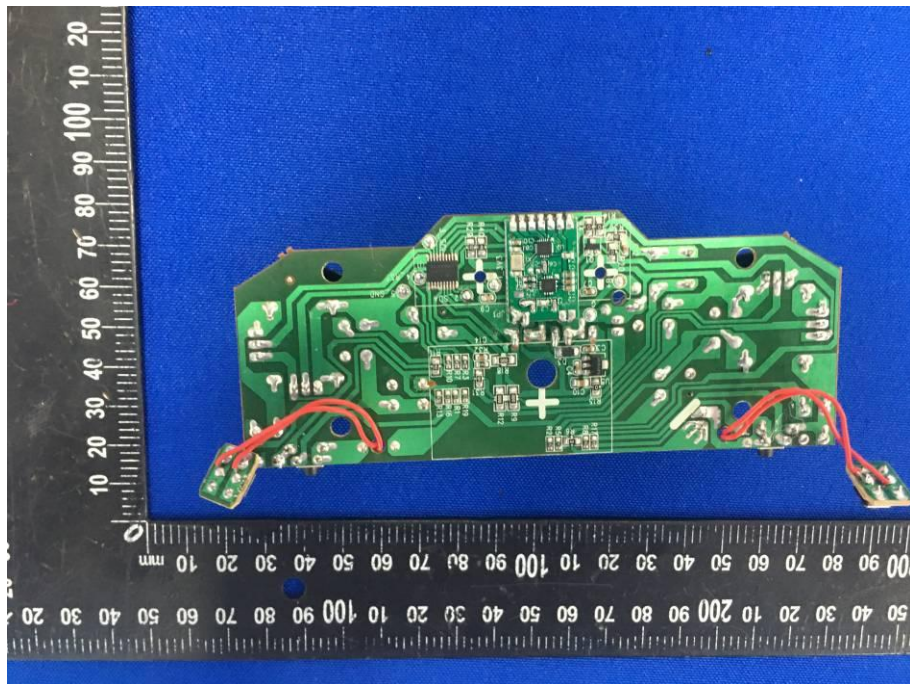


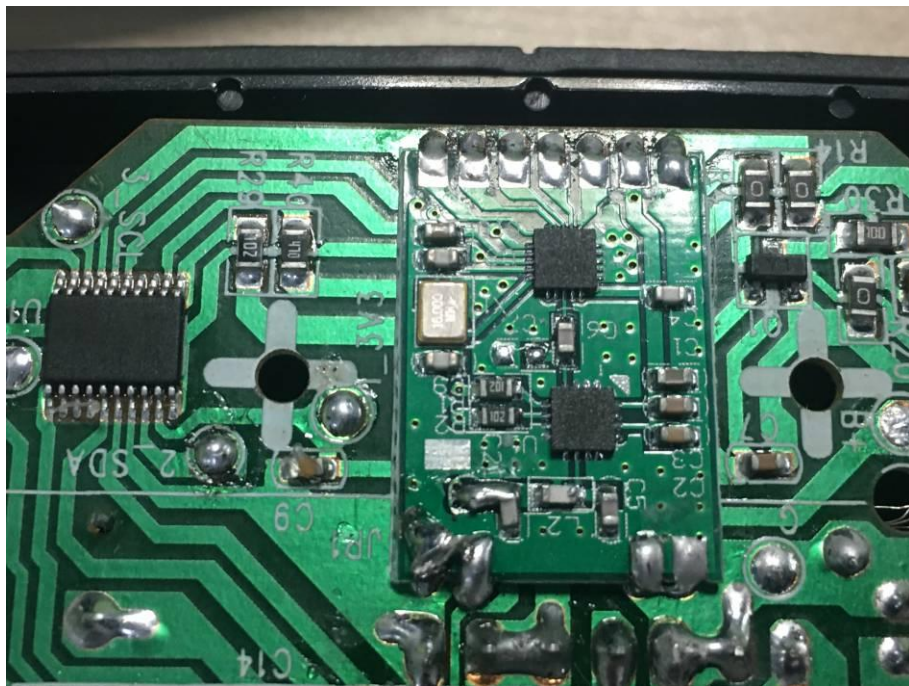
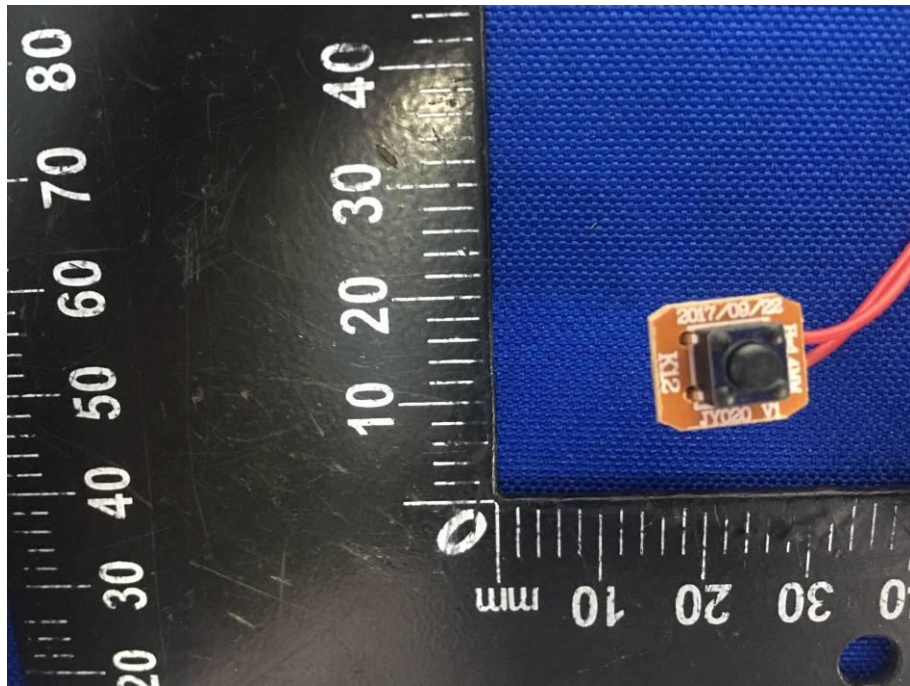














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