


TEST REPORT No.: (5222)348-0717

## TEST REPORT

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Folder No.:	--	Date of Receipt:	2022-12-15
		Test date:	2022-12-15 to 2023-01-03

MANUFACTURER OR SUPPLIER NAME:	--	
MANUFACTURER OR SUPPLIER ADDRESS:	--	
PRODUCT:	AIR MAMBA, AIR SHARK	
MODEL REFERENCE:	84753	
ADDITIONAL MODEL & MODEL DIFFERENCE:	--	
RATED VOLTAGE:	Remote: 4.5Vd.c. ("AAA" size battery x 3) Air Plane: 3.7Vd.c. (Internal rechargeable battery x 1)	
REMARKS:	--	
SAMPLE NO.:	(5222)348-0171	

The submitted sample of the above equipment has been tested according to the requirements of the following standards:

EN IEC 55014-1:2021  
EN IEC 55014-2:2021  
EN IEC 61000-3-2:2019+A1:2021  
EN 61000-3-3:2013+A2:2021

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Assistant Manager,  
EMC Department

Name:

Date:

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## 1 RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
CE2212WDG0122	Original release	Jan. 11, 2023

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## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	AIR MAMBA, AIR SHARK
<b>MODEL NO.</b>	84753
<b>ADDITIONAL MODEL</b>	N/A
<b>POWER SUPPLY</b>	Remote control: DC 4.5V(1.5V*AAA*3) from battery; Air Plane: DC 3.7V from Li-ion battery or DC 5V from USB host unit
<b>GROUP / CATEGORY</b>	Category III
<b>THE HIGHEST CLOCK FREQUENCY</b>	Below 15MHz
<b>CABLE SUPPLIED</b>	N/A

#### Notes:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2212WDG0122) for detailed product photo.

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## 2.2 DESCRIPTION OF TEST MODES

The EUT were tested under the following modes, the final worst mode was marked in boldface and recorded in this report.

### CONDUCTED EMISSION TEST:

Description of Test Mode	Test Voltage
Charging	DC 5V from adapter input AC 230V 50Hz

### RADIATED EMISSION TEST:

Description of Test Mode	Test Voltage
Normal working	DC 3.7V Supplied by Li-ion Battery
Standby	
Charging	DC 5V from adapter input AC 230V 50Hz

### HARMONICS AND FLICKER TESTS:

Description of Test Mode	Test Voltage
Charging	DC 5V from adapter input AC 230V 50Hz

### IMMUNITY TESTS:

Description of Test Mode	Test Voltage
Normal working	DC 3.7V Supplied by Li-ion Battery
Standby	
Charging	DC 5V from adapter input AC 230V 50Hz

## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without other necessary accessories or support units.

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### 2.4 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remark
EN IEC 55014-1: 2021	Terminal continuous disturbance voltage emission test (AC Mains)	PASS	Meets limits minimum passing margin is -13.91dB at 0.55959MHz
	Terminal continuous disturbance voltage emission test (DC Port)	PASS	Meets requirement limit Minimum passing margin is -19.12 dB at 4.39800 MHz
	Radiated Test (30MHz~1GHz)	PASS	Meets Limits Minimum passing margin is -4.77dB at 838.98MHz
EN IEC 61000-3-2: 2019+A1:2021	Harmonic current emissions	PASS	Meets the requirements.
EN 61000-3-3: 2013+A2:2021	Voltage fluctuations & flicker	PASS	Meets the requirements

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<b>IMMUNITY EN IEC 55014-2</b>			
<b>Standard</b>	<b>Test Type</b>	<b>Result</b>	<b>Remark</b>
IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3:2020 ED.4.0	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4:2012 ED. 3.0	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2017 ED. 3.1	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2013 ED. 4.0	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2020 ED. 3.0	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of Voltage dips and interruption: 0% U <sub>T</sub> – 0.5 period, Performance Criterion A 40% U <sub>T</sub> – 10 period, Performance Criterion A 70% U <sub>T</sub> – 25 period, A



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## 2 EMISSION TEST

### 2.1 TERMINAL CONTINUOUS DISTURBANCE VOLTAGE EMISSION MEASUREMENT

#### 2.1.1 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Jan. 18, 23
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Jan. 23, 23
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Jan. 18, 23
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jul. 27, 23
Coaxial RF Cable	/	CE CABLE	C2310066DG	Jul. 24, 23
Test software	ADT	ADT_Conc_V7.3.7	N/A	N/A

- NOTES:
1. The test was performed in shielded room 553.
  2. Peak and average detector quick scan are showed on the graph and final quasi-peak and average detector data are measured, the worst-case is recorded in the following graph and table.
  3. Frequency range scanned: 150kHz to 30MHz.
  4. Only emissions significantly above equipment noise floor are reported.
  5. Uncertainty:  $\pm 2.68$ dB at a level of confidence of 95%.
  6. The calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

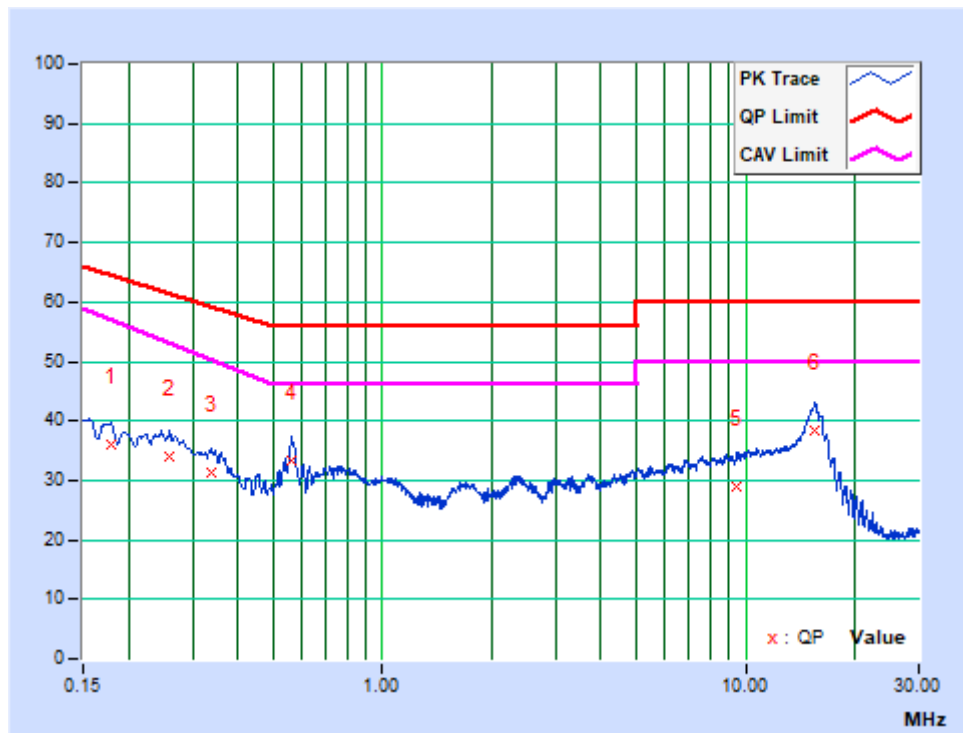
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**2.1.2 TEST RESULTS**

**AC Mains:**

<b>TEST MODE</b>	See section 1.2	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 58% RH	<b>TESTED BY</b>	Summer

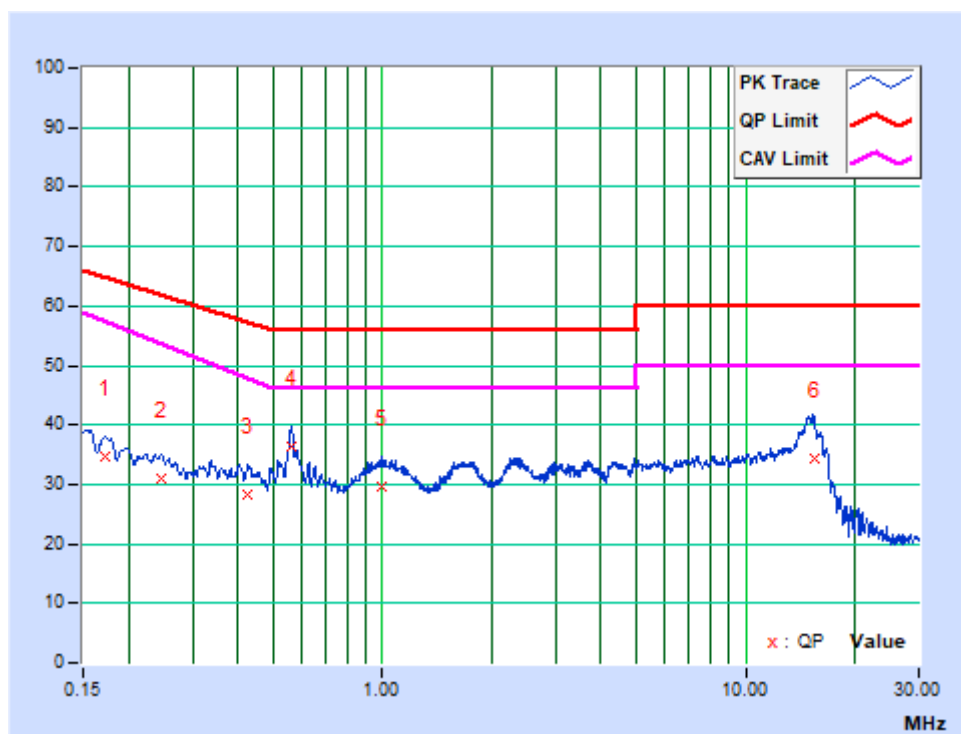
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17925	9.91	26.97	11.85	36.88	21.76	64.52	57.08	-27.64	-35.31
2	0.24488	10.01	24.76	12.17	34.77	22.18	61.93	53.71	-27.16	-31.53
3	0.26925	10.03	23.60	11.16	33.63	21.19	61.14	52.68	-27.51	-31.49
4	0.55959	10.14	26.19	19.53	36.33	29.67	56.00	46.00	-19.67	-16.33
5	0.71250	10.17	20.09	9.06	30.26	19.23	56.00	46.00	-25.74	-26.77
6	17.72925	10.69	25.09	13.26	35.78	23.95	60.00	50.00	-24.22	-26.05



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<b>TEST MODE</b>	See section 1.2	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 58% RH	<b>TESTED BY</b>	Summer

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.75	25.45	11.95	35.20	21.70	66.00	59.00	-30.80	-37.30
2	0.17933	9.80	25.10	12.44	34.90	22.24	64.52	57.07	-29.62	-34.83
3	0.34335	9.97	18.54	13.87	28.51	23.84	59.12	50.06	-30.61	-26.22
<b>4</b>	<b>0.55959</b>	<b>10.00</b>	<b>28.37</b>	<b>22.09</b>	<b>38.37</b>	<b>32.09</b>	<b>56.00</b>	<b>46.00</b>	<b>-17.63</b>	<b>-13.91</b>
5	2.22225	10.15	19.95	15.53	30.10	25.68	56.00	46.00	-25.90	-20.32
6	17.63700	10.69	23.50	14.66	34.19	25.35	60.00	50.00	-25.81	-24.65

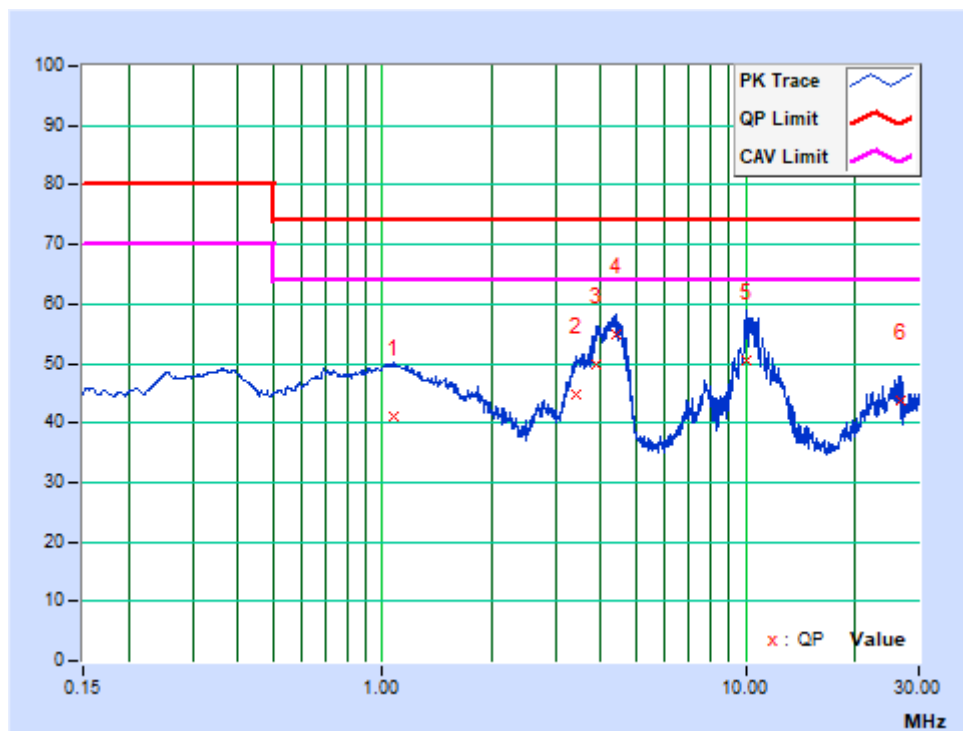


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### DC Port:

<b>TEST MODE</b>	See section 1.2	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>PHASE</b>	Positive (+)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 58% RH	<b>TESTED BY</b>	Summer

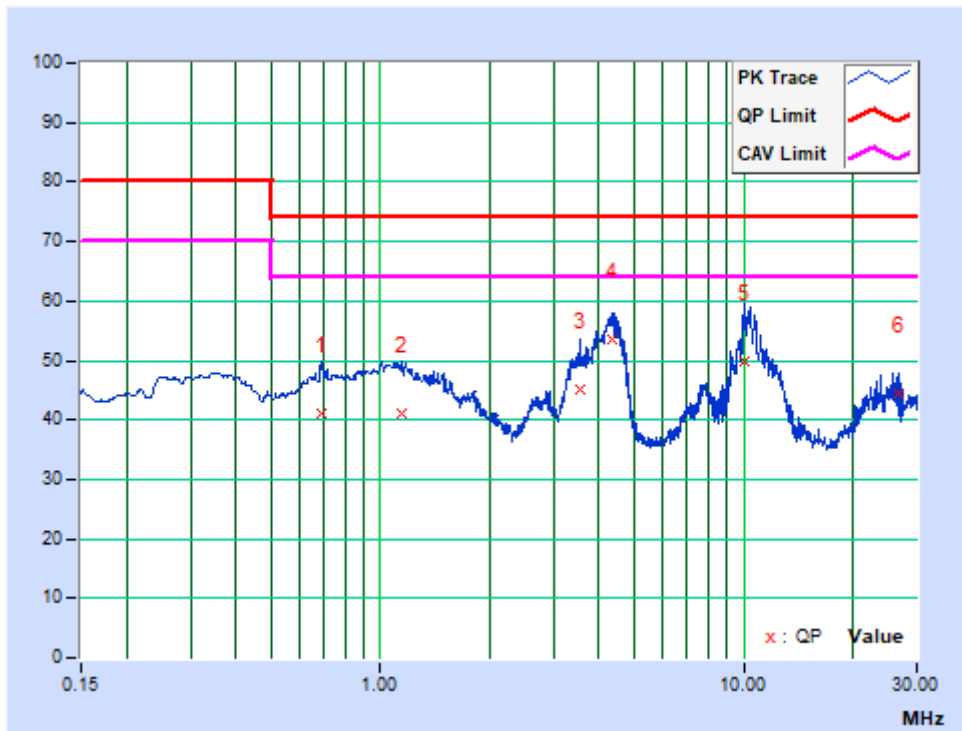
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	1.07708	29.84	11.36	-2.64	41.20	27.20	74.00	64.00	-32.80	-36.80
2	3.41925	29.83	15.02	7.21	44.85	37.04	74.00	64.00	-29.15	-26.96
3	3.90075	29.84	20.13	10.75	49.97	40.59	74.00	64.00	-24.03	-23.41
<b>4</b>	<b>4.39800</b>	<b>29.85</b>	<b>25.03</b>	<b>12.94</b>	<b>54.88</b>	<b>42.79</b>	<b>74.00</b>	<b>64.00</b>	<b>-19.12</b>	<b>-21.21</b>
5	10.03200	29.93	20.71	14.61	50.64	44.54	74.00	64.00	-23.36	-19.46
6	26.60775	30.14	13.71	9.17	43.85	39.31	74.00	64.00	-30.15	-24.69



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<b>TEST MODE</b>	See section 1.2	<b>\6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>PHASE</b>	Negative (-)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 58% RH	<b>TESTED BY</b>	Summer

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.68756	29.92	11.01	2.60	40.93	32.52	74.00	64.00	-33.07	-31.48
2	1.14754	29.84	11.21	0.12	41.05	29.96	74.00	64.00	-32.95	-34.04
3	3.53850	29.83	15.42	7.75	45.25	37.58	74.00	64.00	-28.75	-26.42
4	4.33061	29.85	23.58	12.20	53.43	42.05	74.00	64.00	-20.57	-21.95
5	10.08150	29.93	19.95	14.43	49.88	44.36	74.00	64.00	-24.12	-19.64
6	26.61000	30.14	14.45	9.20	44.59	39.34	74.00	64.00	-29.41	-24.66



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## 2.2 RADIATED EMISSION MEASUREMENT

### 2.2.1 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU26	100005	Apr. 19, 23
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Jan. 18, 23
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Jan. 09, 23
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Jan. 09, 23
Preamplifier	EMCI	EMC1135	980378	Mar. 09, 23
Preamplifier	EMCI	EMC1135	980423	Mar. 09, 23
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Oct. 15, 23
Coaxial RF Cable	/	10m Below 1GHz	C2310084DG	Jul. 26, 23
Coaxial RF Cable	/	10m Below 1GHz	C2310085DG	Jul. 26, 23
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A

**NOTES:** 1. The test was performed in 10m Chamber.

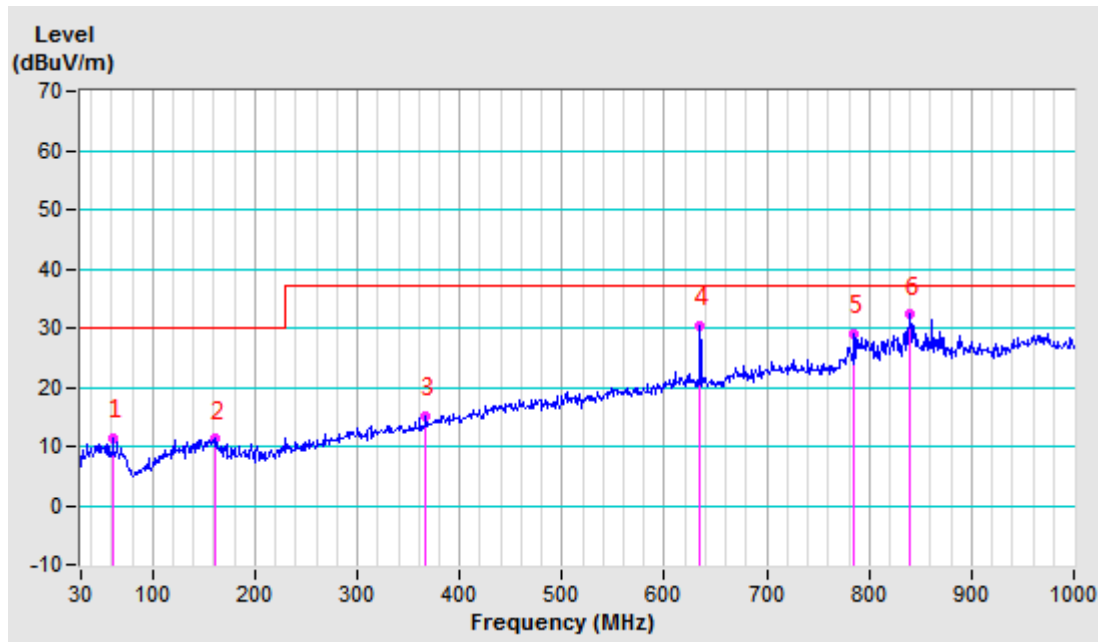
2. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
3. Negative sign (-) in the margin column signify levels below the limit.
4. Frequency range scanned: 30MHz to 1000MHz.
5. Only emissions significantly above equipment noise floor are reported.
6. Uncertainty:  $\pm 4.62$  dB at a level of confidence of 95%.
7. The calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

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**2.2.2 TEST RESULTS**

<b>TEST MODE</b>	See section 1.2	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 64% RH	<b>TESTED BY:</b> Jay	

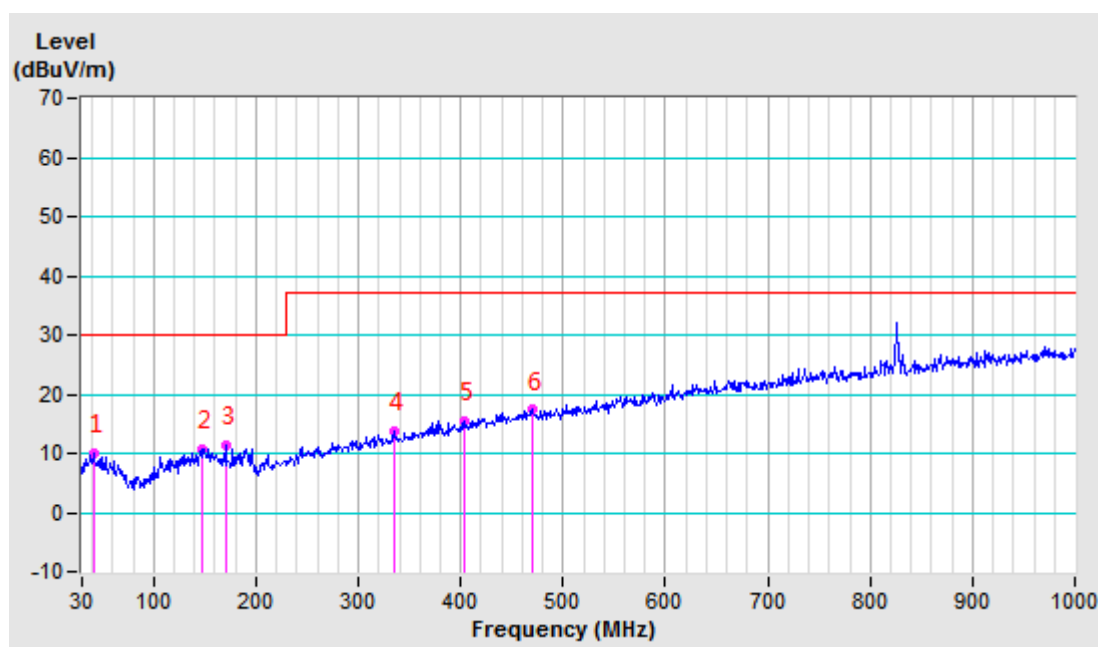
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 10 M</b>								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	61.16	-21.34	32.62	11.28	30.00	-18.72	400	42
2	160.47	-19.55	30.80	11.25	30.00	-18.75	400	268
3	365.86	-16.62	31.82	15.20	37.00	-21.80	200	70
4	635.16	-9.77	40.13	30.36	37.00	-6.64	200	74
5	785.51	-7.22	36.25	29.03	37.00	-7.97	400	171
6	838.98	-6.30	38.53	32.23	37.00	-4.77	400	1



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<b>TEST MODE</b>	See section 1.2	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>TEST VOLTAGE</b>	See section 1.2	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz
<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 64% RH	<b>TESTED BY:</b> Jay	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	41.50	-20.53	30.56	10.03	30.00	-19.97	300	34
2	146.55	-19.74	30.55	10.81	30.00	-19.19	300	253
3	170.22	-20.71	32.00	11.29	30.00	-18.71	100	338
4	335.18	-17.19	31.02	13.83	37.00	-23.17	100	257
5	403.95	-15.15	30.74	15.59	37.00	-21.41	300	37
6	470.31	-13.38	30.68	17.30	37.00	-19.70	300	336





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**3 HARMONICS CURRENT MEASUREMENT**

**3.1.1 LIMITS OF HARMONICS CURRENT MEASUREMENT**

**TEST STANDARD: EN IEC 61000-3-2**

Limits for Class A equipment		Limits for Class D equipment		
Harmonic Order n	Max. permissible harmonics current A	Harmonic Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

- NOTES:** 1. Class A and Class D are classified according to section 5 of EN IEC 61000-3-2.  
 2. According to section 7 of EN IEC 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 5 W and no limits apply for equipment with an active input power up to and including 75 W.

◆ **Limits for Class B equipment:**

For class B equipment, the harmonics of the input current shall not exceed the maximum permissible values given for class A equipment multiplied by a factor of 1.5.

Limits for Class C equipment	
Harmonic Order n	Max. permissible harmonics current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	27
5	10
7	7
9	5
11<=n<=39 (odd harmonics only)	3

## TEST REPORT No.: (5222)348-0717

- NOTES:** 1. Lighting equipment having a rated power greater than or equal to 5 W and less than or equal to 25 W shall not exceed the power-related limits of class D, column 2. or the third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 % and the fifth harmonic current shall not exceed 61 %. In addition, the waveform of the input current shall be such that it reaches the 5 % current threshold before or at 60°, has its peak value before or at 65° and does not fall below the 5 % current threshold before 90°, referenced to any zero crossing of the fundamental supply voltage. Or the THD shall not exceed 70 %. The third order harmonic current, expressed as a percentage of the fundamental current, shall not exceed 35 %, the fifth order current shall not exceed 25 %, the seventh order current shall not exceed 30 %, the ninth and eleventh order currents shall not exceed 20 % and the second order current shall not exceed 5 %.
2. For luminaires with incandescent lamps and built-in phase control dimming having a rated power greater than 25 W, the harmonics of the input current shall not exceed the Class C equipment limits.

### 3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	Jan. 18, 23
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	Jan. 18, 23
Test Software	California Instruments	CTS 4 – V4.29.0	N/A	N/A

- NOTES:** 1. The test was performed in EMS Room 2.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

# TEST REPORT No.: (5222)348-0717

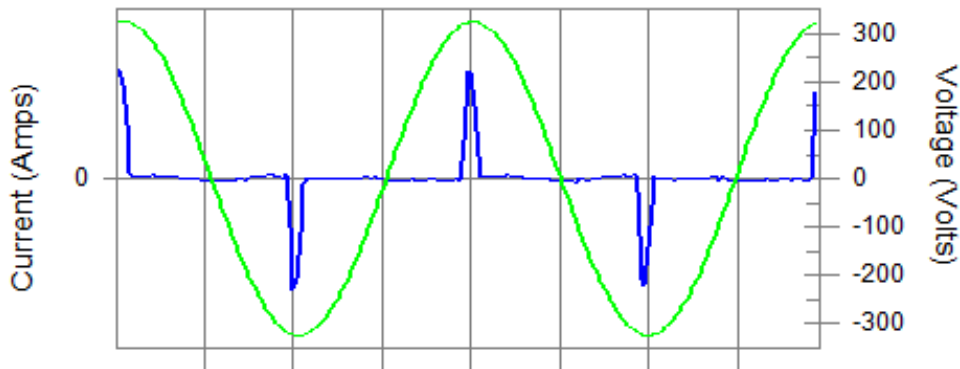
## 3.1.3 TEST RESULTS

### Harmonics – Class-A per IEC 61000-3-2:2018/AMD1:2020(Run time)

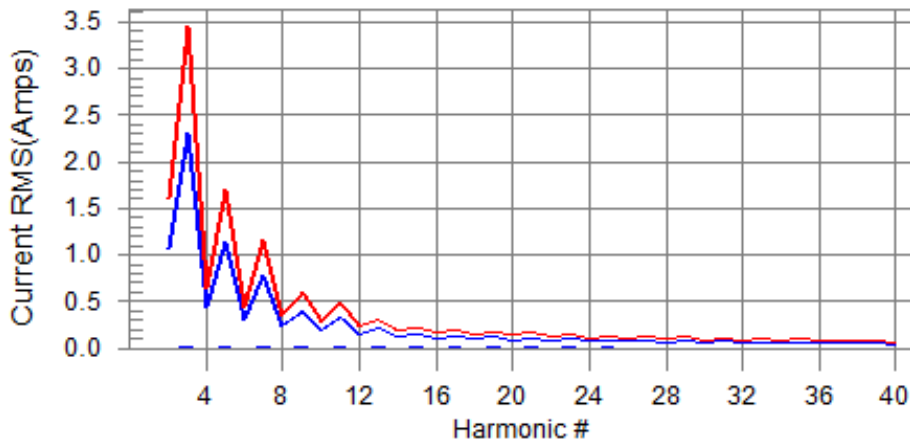
EUT: Remote controlled Aircraft Model: 84753      Tested by: Cheng zhong  
Test category: Class-A (European limits)      Test Margin: 100  
Test date: 2022/12/22      Start time: 11:12:27      End time: 11:15:08  
Test duration (min): 2.5      Data file name: H-000107.cts\_data  
Comment: Charging  
Customer: P22120122

Test Result: Pass      Source qualification: Normal

#### Current & voltage waveforms



#### Harmonics and Class A limit line      European Limits



Test result: Pass      Worst harmonics H15-3.0% of 150% limit, H15-4.5% of 100% limit

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**TEST REPORT No.: (5222)348-0717**

**Current Test Result Summary (Run time)**

EUT: Remote controlled Aircraft Model: 84753      Tested by: Cheng zhong.  
 Test category: Class-A (European limits)      Test Margin: 100.  
 Test date: 2022/12/22      Start time: 11:12:27      End time: 11:15:08.  
 Test duration (min): 2.5      Data file name: H-000107.cts\_data.  
 Comment: Charging.  
 Customer: P22120122.

Test Result: Pass      Source qualification: Normal.  
 IHC(A): 0.026      I-THD(%): 226.7      POHC(A): 0.007      POHC Limit(A): 0.251

**Highest parameter values during test:**

V\_RMS (Volts): 229.94      Frequency(Hz): 50.00.  
 I\_Peak (Amps): 0.150      I\_RMS (Amps): 0.029.  
 I\_Fund (Amps): 0.011      Crest Factor: 5.446.  
 Power (Watts): 2.6      Power Factor: 0.405.

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.010	2.300	0.5	0.012	3.450	0.3	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.010	1.140	0.9	0.011	1.710	0.6	Pass
6	0.000	0.300	N/A	0.001	0.450	N/A	Pass
7	0.010	0.770	1.3	0.010	1.155	0.9	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.009	0.400	2.3	0.009	0.600	1.6	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.008	0.330	2.5	0.009	0.495	1.7	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.008	0.210	3.6	0.008	0.315	2.5	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.007	0.150	4.5	0.007	0.225	3.0	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.006	0.132	4.4	0.006	0.198	3.0	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.005	0.118	N/A	0.005	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.004	0.107	N/A	0.004	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.003	0.098	N/A	0.003	0.147	N/A	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.003	0.090	N/A	0.003	0.135	N/A	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass
27	0.002	0.083	N/A	0.002	0.125	N/A	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.001	0.078	N/A	0.001	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.001	0.073	N/A	0.001	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.001	0.068	N/A	0.001	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

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## 4 VOLTAGE FLUCTUATION AND FLICKERS MEASUREMENT

### 4.1.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS MEASUREMENT

TEST STANDARD: EN 61000-3-3

TEST ITEM	LIMIT	NOTE
P <sub>st</sub>	1.0	P <sub>st</sub> means short-term flicker indicator.
P <sub>lt</sub>	0.65	P <sub>lt</sub> means long-term flicker indicator.
T <sub>d(t)</sub> (ms)	500	T <sub>d(t)</sub> means maximum time that d(t) exceeds 3.3%.
d <sub>max</sub> (%)	4	d <sub>max</sub> means maximum relative voltage change.
dc (%)	3.3	dc means relative steady-state voltage change

### 4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
5kVA AC Power Source	California Instruments	5001ix-400	55194	Jan. 18, 23
Harmonic/Flicker Test System	California Instruments	PACS-1	72134	Jan. 18, 23
Test Software	California Instruments	CTS 4 – V4.29.0	N/A	N/A

- NOTES:** 1. The test was performed in EMS Room 2.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

**TEST REPORT No.: (5222)348-0717**

**4.1.3 TEST RESULTS**

<b>TEST MODE</b>	See section 1.2		
<b>FUNDAMENTAL VOLTAGE</b>	229.81Vrms	<b>OBSERVATOPM PERIOD (Tp)</b>	10 min
<b>ENVIRONMENTAL CONDITIONS</b>	26.7deg. C, 63.2%RH,	<b>TESTED BY:</b> Cheng Zhong	

<b>TEST PARAMETER</b>	<b>MEASUREMENT VALUE</b>	<b>LIMIT</b>	<b>REMARK</b>
P <sub>st</sub>	0.288	1.000	PASS
P <sub>lt</sub>	0.126	0.650	PASS
T <sub>d(t)</sub> (ms)	0	500.0	PASS
d <sub>max</sub> (%)	0.00	4.00	PASS
dc (%)	0.00	3.30	PASS

- NOTES:**
- (1) P<sub>st</sub> means short-term flicker indicator.
  - (2) P<sub>lt</sub> means long-term flicker indicator.
  - (3) T<sub>d(t)</sub> means maximum time that d(t) exceeds 3.3%
  - (4) d<sub>max</sub> means maximum relative voltage change.
  - (5) dc means relative steady-state voltage change.

## 5 IMMUNITY TEST

### 5.1 GENERAL PERFORMANCE CRITERIA DESCRIPTION

<b>CRITERION A</b>	The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
<b>CRITERION B</b>	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.
<b>CRITERION C</b>	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.



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## 5.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

### 5.2.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Discharge Voltage:</b>	Air Discharge : 8 kV (Direct) Contact Discharge : 4 kV (Direct & Indirect)
<b>Polarity:</b>	Positive & Negative
<b>Number of Discharge:</b>	20 times at each test point
<b>Discharge Mode:</b>	Single Discharge
<b>Discharge Period:</b>	1 second

### 5.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
ESD Generator	TESEQ	NSG 437	279	Mar. 06,23
Test Software	TESEQ	V03.03	N/A	N/A

- NOTES:** 1. The test was performed in ESD Room.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



**TEST REPORT No.: (5222)348-0717**

**5.2.3 TEST RESULTS**

<b>TEST MODE</b>	See section 2.2	<b>TEST VOLTAGE</b>	See section 2.2
<b>ENVIRONMENTAL CONDITIONS</b>	22.5deg. C, 45.7% RH, 100.2kPa	<b>TESTED BY:</b> Zhuolin Peng	

<b>Direct Discharge Application</b>				
<b>Test Level (kV)</b>	<b>Polarity</b>	<b>Test Point</b>	<b>Test Result of Contact Discharge</b>	<b>Test Result of Air Discharge</b>
8	+/-	Charging port	N/A	B
4	+/-	All metal Parts	A	N/A
8	+/-	Other non-metal Parts	N/A	A

<b>Indirect Discharge Application</b>				
<b>Discharge Level (kV)</b>	<b>Polarity</b>	<b>Test Point</b>	<b>Test Result of HCP</b>	<b>Test Result of VCP</b>
4	+/-	HCP	A	N/A
4	+/-	VCP	N/A	A

**NOTES:** A: There was no change compared with initial operation during the test.

B: In normal working mode, discharge 8kV air at the charging port, the prototype is disconnected and needs to be restarted (manual switch).

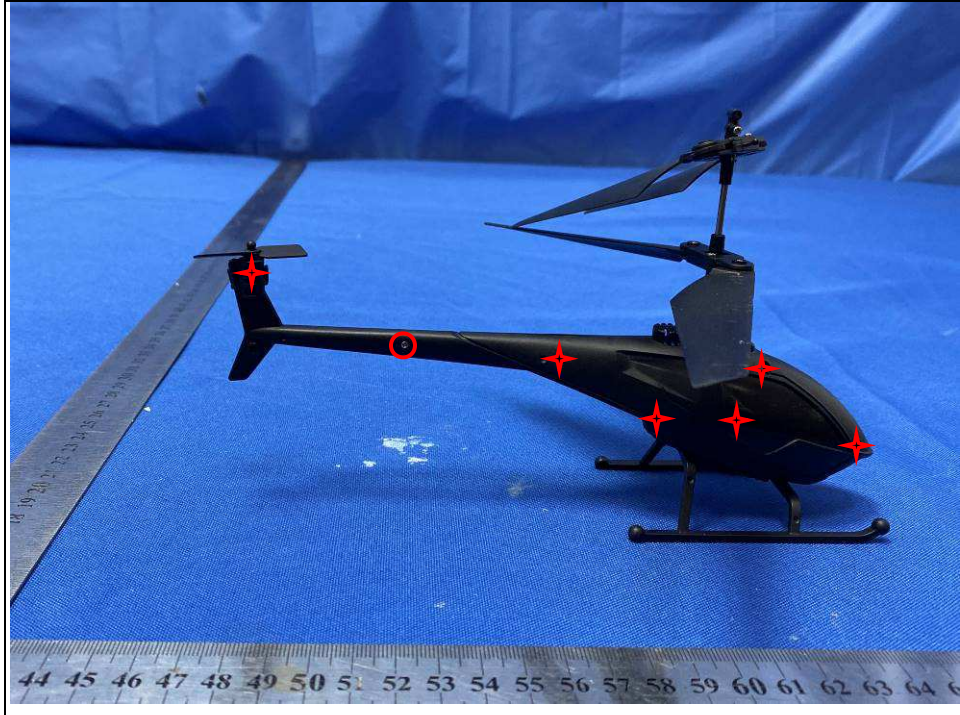
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ESD TEST POINT

( ○ - Direct Contact Discharge; ✦ - Air Discharge)



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## 5.3 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

### 5.3.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-3
<b>Frequency Range:</b>	80 MHz ~ 1000 MHz
<b>Field Strength:</b>	3 V/m
<b>Modulation:</b>	1 kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Antenna Height:</b>	1.5 m
<b>Dwell Time:</b>	3 seconds

### 5.3.2 TEST INSTRUMENT

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Agilent	N5181A	MY50142530	Jul. 27, 23
Antenna Log-Periodic	AR	ATR80M6G	0337307	N/A
Antenna Log-Periodic	AR	ATS700M11G	0336821	N/A
Switch Controller	AR	SC1000	0337343	N/A
RF Power Meter	Boonton	4242	13984	Jul. 20, 23
Power Sensor	Keysight	U2021XA	MY55060016	Feb. 23, 23
Power Sensor	Boonton	51011EMC	35715	Jul. 20, 23
E-Field probe	Narda	NBM-520	2403/01B	Jun. 16, 23
E-Field probe	Narda	EP601	8112X01099	Jun. 28, 23
Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A
Power Amplifier	TESEQ	CBA 3G-100	T44030	N/A
Power Amplifier	TESEQ	CBA 6G-050	1041204	N/A
Dual Directional Coupler	TESEQ	C5982	95208	Jul. 20, 23
Dual Directional Coupler	TESEQ	C6187	95175	Jul. 20, 23
Dual Directional Coupler	TESEQ	CPH-274F	M251304-01	Jul. 20, 23
Audio analyzer	Rohde&Schwarz	UPV	101397	Jul. 27, 23
Conditioning Amplifier	B&K	2690-W-013	3241205	Jan. 25, 23
Ear Simulator	B&K	4192	2764719	Apr. 15, 23
Test Software	Tonscend	TS+	3.0.0.1	N/A
Test Software	ADT	BVADT_RS_V7.6.4-DG	N/A	N/A

- NOTES:** 1. The test was performed in RS chamber.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



**TEST REPORT No.: (5222)348-0717**

**5.3.3 TEST RESULTS**

<b>TEST MODE</b>	See section 1.2	<b>TEST VOLTAGE</b>	See section 1.2
<b>ENVIRONMENTAL CONDITIONS</b>	20.8 deg. C, 72.3% RH	<b>TESTED BY:</b> Zhuolin Peng	

Field Strength (V/m)	Test Frequency Note#1 (MHz)	Polarization of antenna (Horizontal / Vertical)	Test Distance (m)	Test Result	Remark
3	80-1000	H / V	3	A	N/A

Note#1: Tested Israel SII Frequencies 89,100,107,144,163,196,244,315,434,460,600,825,845,880 MHz

**NOTE:** A: There was no change compared with initial operation during the test.

TEST REPORT No.: (5222)348-0717

## 5.4 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

### 5.4.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-4
<b>Test Voltage:</b>	Power Line : 1 kV
<b>Polarity:</b>	Positive & Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Waveshape :</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	300 ms
<b>Test Duration:</b>	2 minutes

### 5.4.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EFT Module	TESEQ	NSG 3060 Mainframe	1404	Jan. 18, 23
Automated 3- Phase Coupling/ Decoupling Network	TESEQ	CDN 3063	2131	Jan. 18, 23
EFT Coupling Clamp	HAEFELY	IP4A	150407	Jan. 18, 23
Test Software	TESEQ	CDM 3061_0002.30	1361	N/A
Test Software	TESEQ	HVM 3060_0002.30	293	N/A

- NOTES:**
1. The test was performed in EMS Test Room 1.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

**TEST REPORT No.: (5222)348-0717**

**5.4.3 TEST RESULTS**

<b>TEST MODE</b>	See section 1.2	<b>TEST VOLTAGE</b>	See section 1.2
<b>ENVIRONMENTAL CONDITIONS</b>	19.0deg. C, 30.0% RH	<b>TESTED BY:</b> Cheng Zhong	

Pulse Voltage	1.0 kV		0.5 kV		kV		kV	
Pulse Polarity	+	-	+	-	+	-	+	-
L	A	A	A	A	/	/	/	/
N	A	A	A	A	/	/	/	/
L+ N	A	A	A	A	/	/	/	/

**NOTE:** A: There was no change compared with initial operation during the test.

TEST REPORT No.: (5222)348-0717

## 5.5 SURGE IMMUNITY TEST

### 5.5.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-5
<b>Wave-Shape:</b>	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
<b>Test Voltage:</b>	Power Line : 1kV
<b>Surge Input/Output:</b>	L-N
<b>Generator Source</b>	2 ohm between networks
<b>Impedance:</b>	
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	90°/270°
<b>Pulse Repetition Rate:</b>	1 time / 60 Sec.
<b>Number of Tests:</b>	5 positive and 5 negative at selected points

### 5.5.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Telecom Surge Module	TESEQ	NSG 3060 Mainframe	1404	Jan. 18, 23
Automated 3- Phase Coupling/ Decoupling Network	TESEQ	CDN 3063	2131	Jan. 18, 23
CDN	TESEQ	CDN HSS-2	34275	Jan. 18, 23
CDN	TESEQ	CDN 118	30741	Jan. 18, 23
Test Software	TESEQ	CDM 3061_0002.30	1361	N/A
Test Software	TESEQ	HVM 3060_0002.30	293	N/A

- NOTES:**
1. The test was performed in EMS Room.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA

**TEST REPORT No.: (5222)348-0717**

**5.5.3 TEST RESULTS**

<b>TEST MODE</b>	See section 1.2	<b>TEST VOLTAGE</b>	See section 1.2
<b>ENVIRONMENTAL CONDITIONS</b>	19.0deg. C, 30.0% RH	<b>TESTED BY:</b> Cheng Zhong	

\Voltage (kV)	\Phase angle \ Test result \ Test point\ Polarity	0°	90°	180°	270°	DC Power Port
1.0	L-N	+	/	A	/	/
		-	/	/	A	/

**NOTE:** A: There was no change compared with initial operation during the test.

TEST REPORT No.: (5222)348-0717

## 5.6 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

### 5.6.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-6
<b>Frequency Range:</b>	0.15 MHz - 80 MHz
<b>Field Strength:</b>	3 V <sub>r.m.s.</sub>
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of fundamental
<b>Coupled Cable:</b>	Power Mains
<b>Coupling Device:</b>	CDN-M2

### 5.6.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal Generator	Rohde&Schwarz	SMB 100A	102382	Jan. 16, 23
CDN	Luthi	L-801M2/M3	2015	Jul. 27, 23
CDN	TESEQ	T200A	26944	Jan. 23, 23
CDN	TESEQ	ST08A	32256	Mar. 07, 23
CDN	TESEQ	T800	28623	Aug. 18, 23
CDN	FCC	FCC-801-T8-SRJ45	160168	Aug. 10, 23
CDN	TESEQ	CDN M532	37300	Jun. 01, 23
6dB 150Watt Attenuator	Bird	150-A-FFN-06	1507	Jul. 27, 23
Bulk Current Injection Probe	FCC	F-120-9A	160053	Jul. 27, 23
Power Amplifier	PRANA	DR 220	1512-1788	NA
Electromagnetic Injection Clamp	Luthi	EM101	35640	Aug. 12, 23
Audio analyzer	Rohde&Schwarz	UPV	101397	Jul. 27, 23
Conditioning Amplifier	B&K	2690-W-013	3241205	Jan. 25, 23
EAR SIMULATOR	B&K	4192	2764719	Apr. 15, 23
Test Software	Tonscend	TS+	3.0.0.1	N/A
Test Software	ADT	BVADT_CS_V7.6.2	N/A	N/A

- NOTES:** 1. The test was performed in CS test room.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

## TEST REPORT No.: (5222)348-0717

### 5.6.3 TEST RESULTS

TEST MODE	See section 1.2	TEST VOLTAGE	See section 1.2
ENVIRONMENTAL CONDITIONS	20.3deg. C, 71.5% RH	TESTED BY: Zhuolin Peng	

Voltage (V)	Test Frequency Note <sup>#1</sup> (MHz)	Tested Line	Injection Method.	Test Result	Remark
3	0.15 -80 MHz	AC Line	CDN-M2	A	Pass

Note<sup>#1</sup>: Tested Israel SII Frequencies 0.2,0.53,1,1.5,7.1,13.56,21,27.12,40.68,65,68 MHz

**NOTE:** A: There was no change compared with initial operation during the test.

TEST REPORT No.: (5222)348-0717

## 5.7 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

### 5.7.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Three test events in sequence
Interval between Event:	10 seconds
Phase Angle:	0° & 180°
Test Cycle:	3 times

### 5.7.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
DIPS Tester	HAEFELY	PLINE 1610	150370	Jan. 18, 23
Test Software	HAEFELY	SWPL1610 1.43	N/A	N/A

- NOTES:** 1. The test was performed in EMS Room 2.  
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



## TEST REPORT No.: (5222)348-0717

### 5.7.3 TEST RESULTS

<b>TEST MODE</b>	See section 1.2	<b>TEST VOLTAGE</b>	See section 1.2
<b>ENVIRONMENTAL CONDITIONS</b>	19deg. C, 30% RH	<b>TESTED BY:</b> Cheng Zhong	

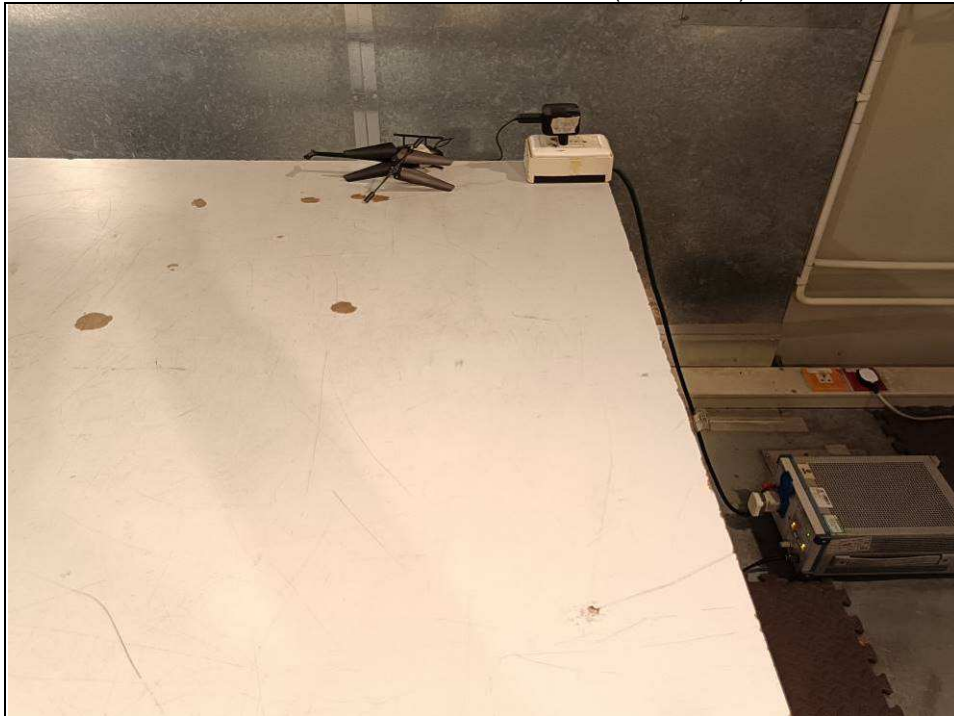
Ut : <u>230</u> Vac <u>50</u> Hz	Durations		Event interval (sec)	Total events (time)	Test result
	(period)	(ms)			
0	0.5	10	10	3	A
40	10	200	10	3	A
70	25	500	10	3	A

**NOTE:** A: There was no change compared with initial operation during the test.

TEST REPORT No.: (5222)348-0717

## 6 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST (AC PORT)

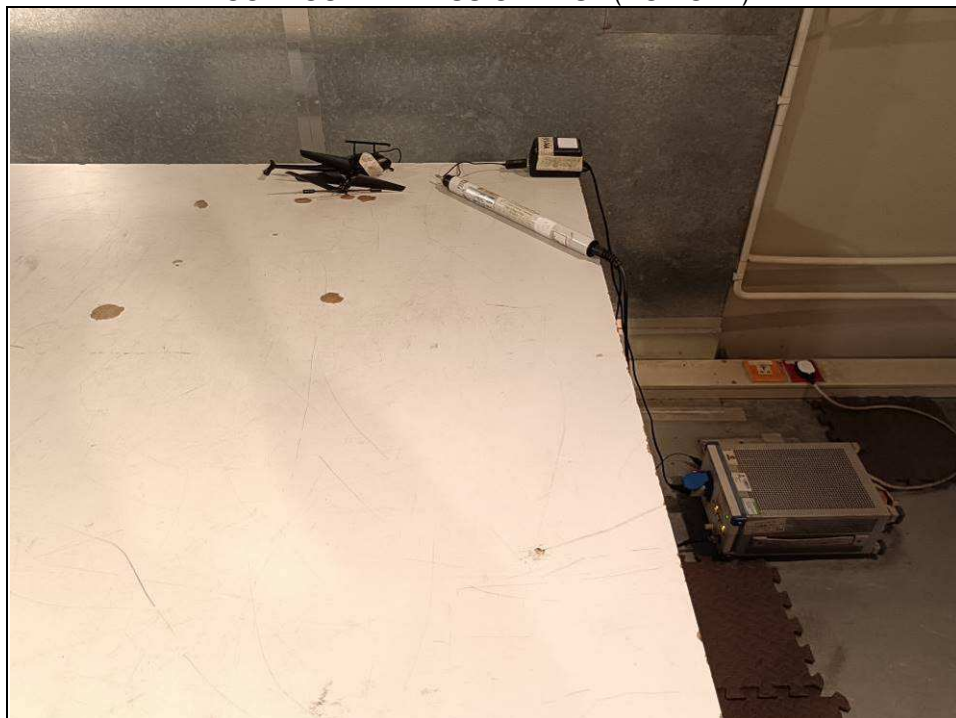


**TEST REPORT No.: (5222)348-0717**

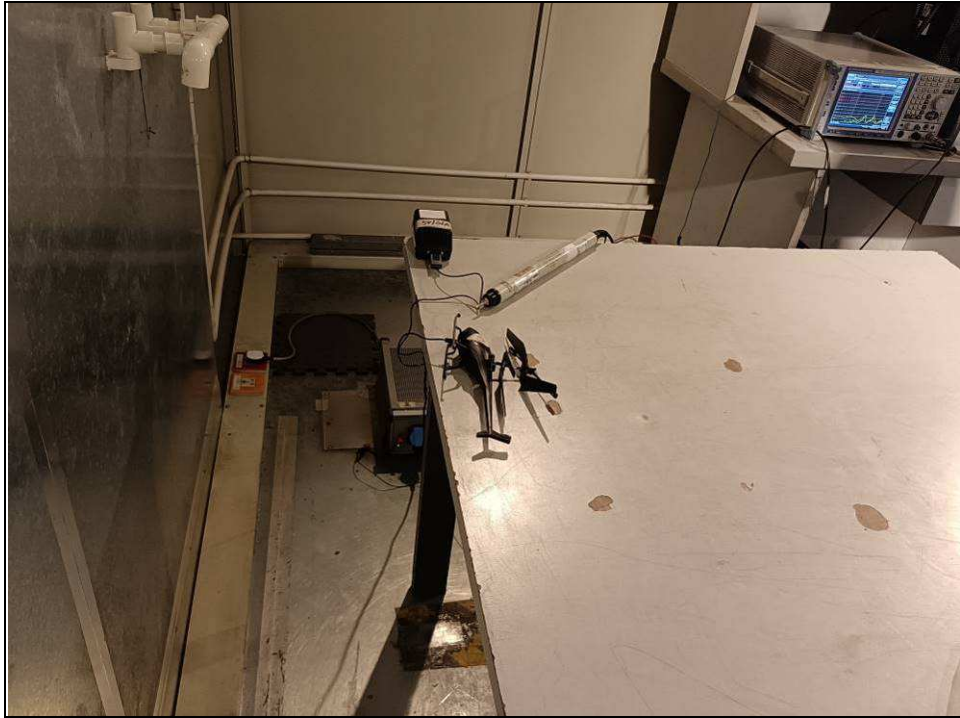


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**CONDUCTED EMISSION TEST (DC PORT)**



**TEST REPORT No.: (5222)348-0717**





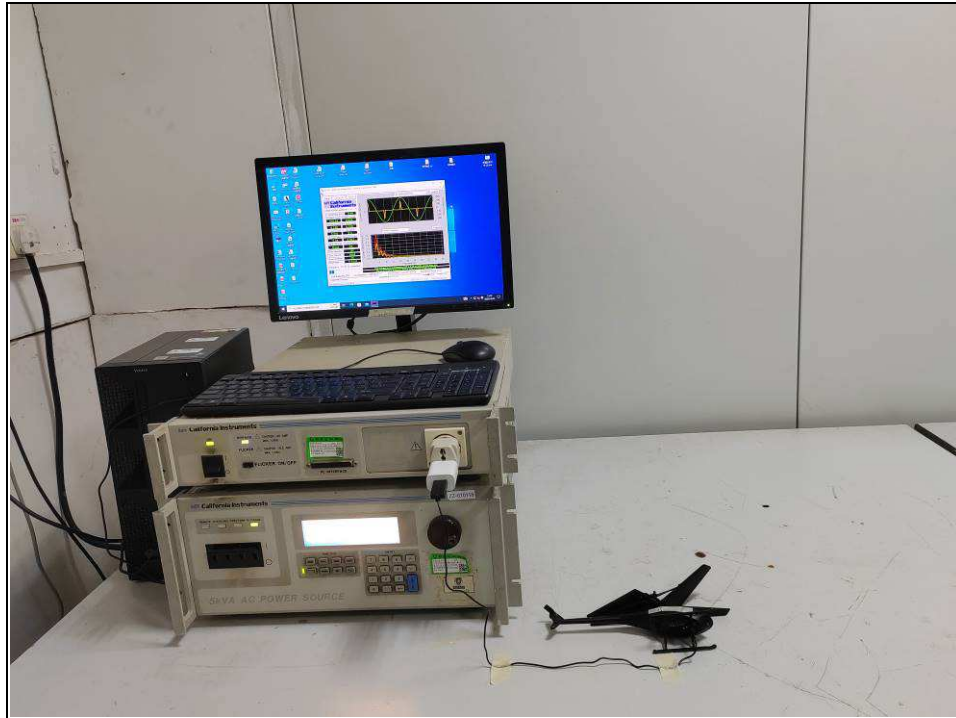
**TEST REPORT No.: (5222)348-0717**

**RADIATED EMISSION TEST < 30MHz~1GHz >**



**TEST REPORT No.: (5222)348-0717**

**HARMONICS EMISSION TEST &  
VOLTAGE FLUCTUATIONS AND FLICKER & DIPS TESTS**





**TEST REPORT No.: (5222)348-0717**

**ESD TEST**



**TEST REPORT No.: (5222)348-0717**

**RS TEST**



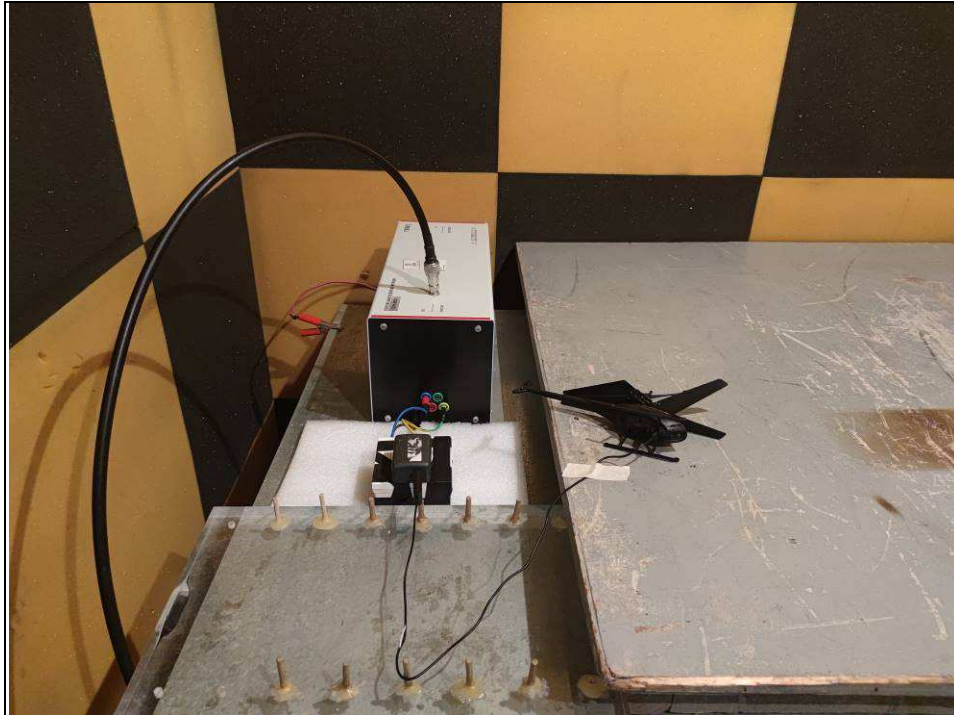
## TEST REPORT No.: (5222)348-0717

### EFT & SURGE TESTS



**TEST REPORT No.: (5222)348-0717**

**CS TEST**



**TEST REPORT No.: (5222)348-0717**

**VOLTAGE DIPS AND INTERRUPTIONS TEST**





TEST REPORT No.: (5222)348-0717

## 7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---