FCC RF Test Report

(NFC)

Applicant:	Inepro BV
Address of Applicant:	Pondweg 7, 2153 PK Nieuw-Vennep, The Netherlands
Equipment Under Test (EUT)	
Product Name:	Red Spider
Model No.:	Red Spider Desktop
Trade Mark:	Red Spider
FCC ID:	2AFBFRSD001
Applicable Standards:	FCC CFR Title 47 Part 15C
Date of Sample Receipt:	08 Sep., 2022
Date of Test:	09 Sep., 2022 to 20 Feb., 2023
Date of Report Issue:	21 Feb., 2023
Test Result:	PASS

Tested by:	Mike.ou ***Test Engineer***	***Date:***	*21 Feb., 2023*
Reviewed by:	Winner Zhang ***Project Engineer***	***Date:***	*21 Feb., 2023*
Approved by:	***Manager***	***Date:***	*21 Feb., 2023*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

1 Version

Version No.	Date	Description
00	*23 Nov., 2022*	*Original*
01	*21 Feb., 2023*	*1. Update section 3.4, 3.5, 3.9, 5.2.* *2. Update test setup photo.*

2 Contents

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3 General Information

3.1 Client Information

Applicant:	Inepro BV
Address:	Pondweg 7, 2153 PK Nieuw-Vennep, The Netherlands
Manufacturer/Factory:	Inepro BV
Address:	Pondweg 7, 2153 PK Nieuw-Vennep, The Netherlands

3.2 General Description of E.U.T.

Product Name:	Red Spider
Model No.:	Red Spider Desktop
Operation Frequency:	125KHz
Channel Numbers:	1
Modulation Type:	ASK
Antenna Type:	Internal Antenna
Power Supply:	DC 5V
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

3.3 Test Mode and Environment

Test Mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation
Remark: *Pre-scan The EUT was placed on three different polar directions tested: i.e. X axis, Y axis, Z axis, and found Y axis was worse case, so the report only reflects the worse axis tested data.*	
Operating Environment:	
Temperature:	15℃ ~ 35℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar

3.4 Description of Test Auxiliary Equipment

Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.

3.5 Measurement Uncertainty

Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.

3.6 Additions to, Deviations, or Exclusions From the Method

No

3.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

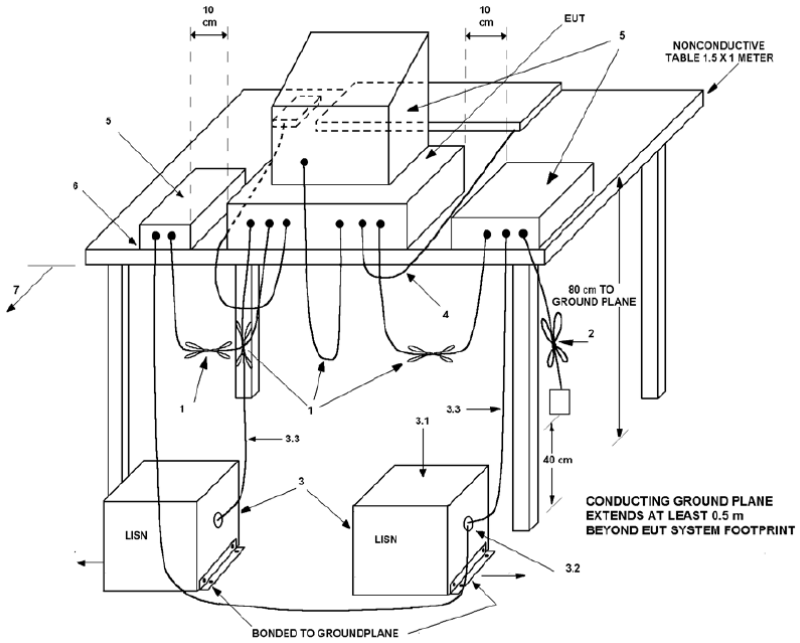
3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	03-07-2022	03-06-2023
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	03-08-2022	03-07-2023
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-20-2022	01-19-2023
				01-10-2023	01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	03-05-2022	03-04-2023
Coaxial Cable (9kHz ~ 30MHz)	JYT	JYT3M-1G-BB-5M	WXG001-6	01-20-2022	01-19-2023
				01-10-2023	01-09-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-20-2022	01-19-2023
				01-10-2023	01-09-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		
EMI Test Software	AUDIX	E3	Version: 6.110919b		

4 Measurement Setup and Procedure

4.1 Test Setup

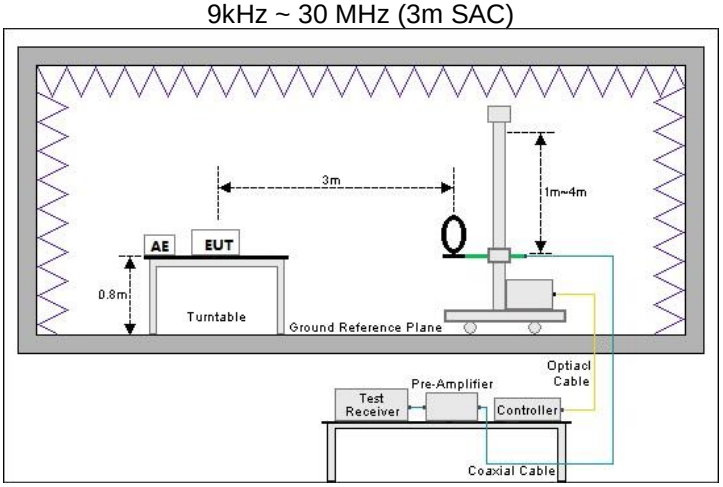
1) Conducted emission measurement:



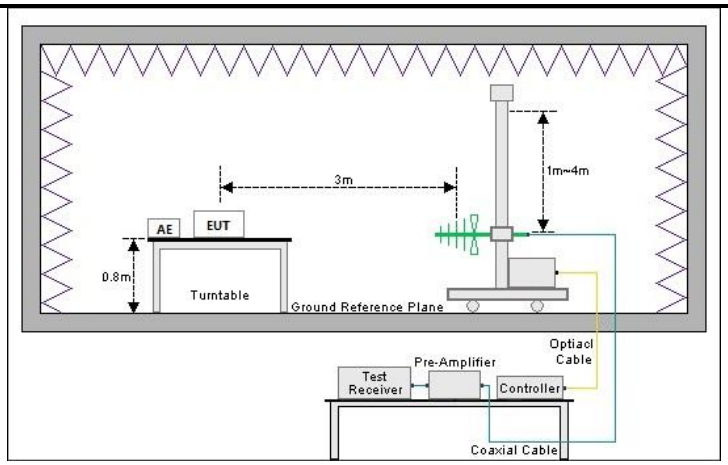
Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014..

2) Radiated emission measurement:

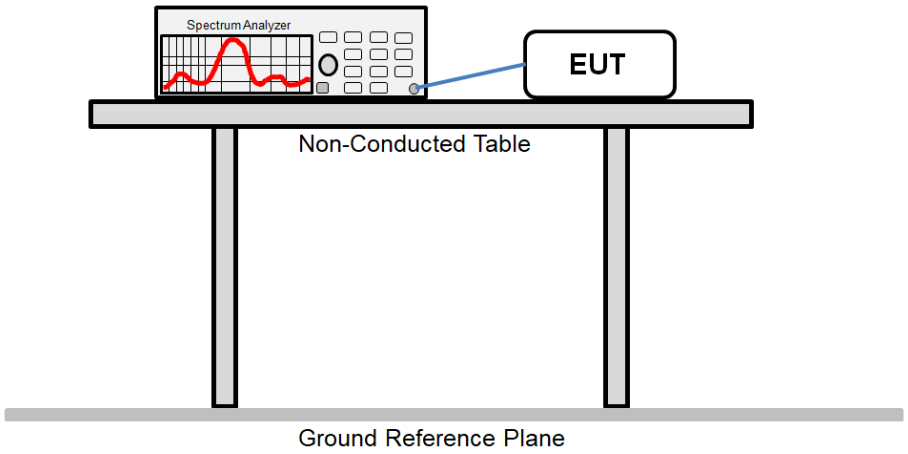
9kHz ~ 30 MHz (3m SAC)



30 MHz ~ 1GHz (3m SAC)


3m
1m~4m
AE
EUT
0.8m
Turntable
Ground Reference Plane
Optiacl Cable
Pre-Amplifier
Test Receiver
Controller
Coaxial Cable

Conducted test method:



4.2 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the RF port of the spectrum analyzer through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. The test data is saved by the screenshot function of the spectrum analyzer.

5 Test Results

5.1 Summary

5.1.1 Clause and Data Summary

Please refer to FCC ID: 2AFBFRS0001, report No.: JYTSZ-R12-2300054 issue by JianYan Testing Group Shenzhen Co., Ltd. The Red Spider Desktop and the Red Spider model are the same internally, including circuit design, layout, components used and internal wiring. The differences between them are as follows: The Red Spider Desktop have four electrical cables. So no need retest.

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.
AC Power Line Conducted Emission	15.207	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.
20dB Bandwidth	15.215(c)	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.
Field Strength of Spurious Emissions	15.209	1. Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001. 2. See section 5.2	Reference report JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001.
Remark: *1. The report is that of JYTSZ-R12-2300054, FCC ID: 2AFBFRS0001 issue by JianYan Testing Group Shenzhen Co., Ltd.* *2. N/A: Not Applicable.*			
Test Method:	*ANSI C63.4-2014* *ANSI C63.10-2013*		

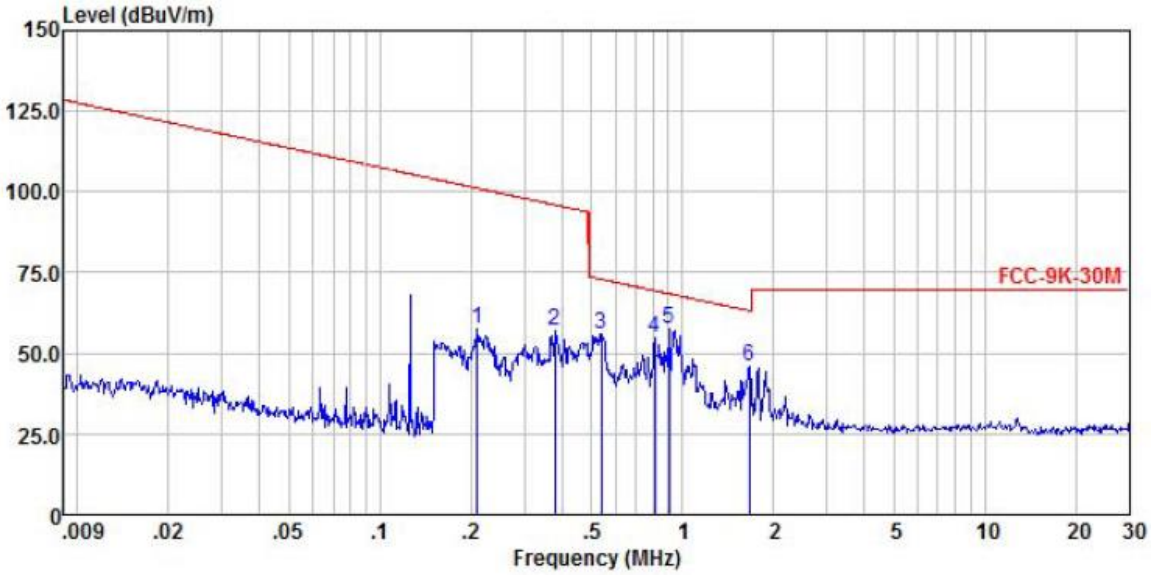
5.1.2 Test Limit

<table>
<tr><th>Items</th><th>Limit</th></tr>
<tr><td>AC Power Line Conducted Emission</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>Quasi-Peak</th><th>Average</th></tr>
<tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr>
<tr><td>0.5 – 5</td><td>56</td><td>46</td></tr>
<tr><td>5 – 30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.
Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>20dB Bandwidth</td><td>N/A</td></tr>
<tr><td>Field Strength of Fundamental

Field Strength of Spurious Emissions</td><td>(d) The field strength of any emissions appearing outside of the 127 KHz shall not exceed the general radiated emission limits in § 15.209.
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009 – 0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490 – 1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705 – 30.0</td><td>30</td><td>30</td></tr>
<tr><td>30 – 88</td><td>100**</td><td>3</td></tr>
<tr><td>88 – 216</td><td>150**</td><td>3</td></tr>
<tr><td>216 – 960</td><td>200**</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
<tr><td colspan="3">** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</td></tr>
</table>
</td></tr>
</table>

5.2 Spurious Emissions Spot check

Product Name:	Red Spider	**Product Model:**	Red Spider Desktop
Test By:	Mike	**Test mode:**	Tx mode
Test Frequency:	150 kHz – 30 MHz	**Polarization:**	Coxial
Test Voltage:	DC 5V		



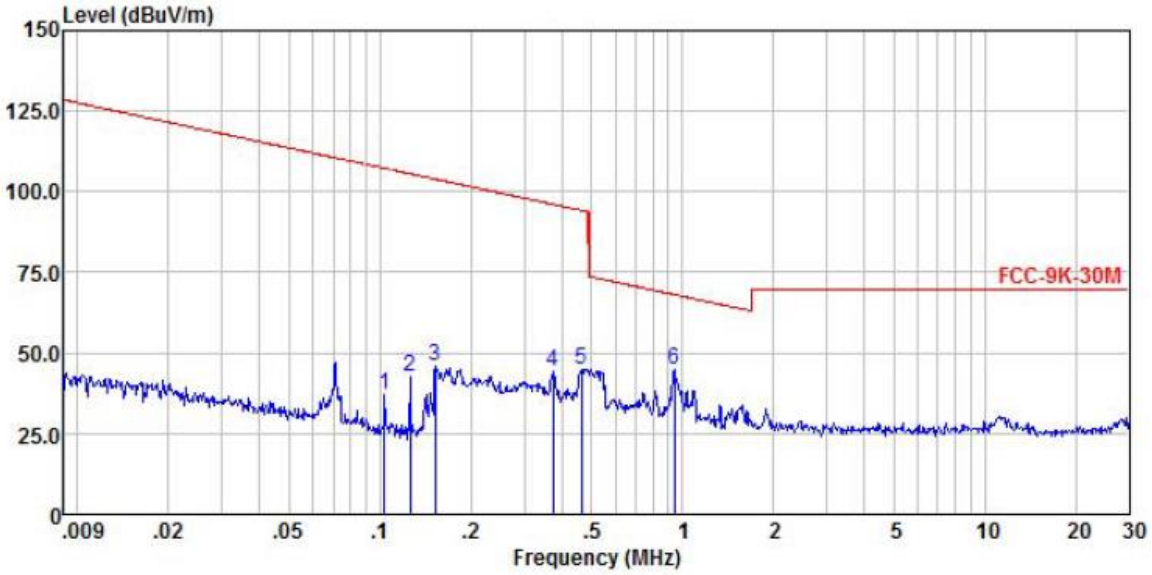
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.209	37.10	20.37	0.04	0.00	57.51	101.20	-43.69	Peak
2	0.379	36.33	20.66	0.06	0.00	57.05	96.04	-38.99	Peak
3	0.541	34.83	20.77	0.09	0.00	55.69	72.94	-17.25	Peak
4	0.812	34.32	20.59	0.09	0.00	55.00	69.43	-14.43	Peak
5	0.902	37.15	20.55	0.11	0.00	57.81	68.51	-10.70	Peak
6	1.671	25.13	20.45	0.17	0.00	45.75	63.17	-17.42	Peak

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of 9 kHz~150 kHz are background noise and very lower than the limit, so not show in test report.

Product Name:	Red Spider	Product Model:	Red Spider Desktop
Test By:	Mike	Test mode:	Tx mode
Test Frequency:	150 kHz – 30 MHz	Polarization:	Coplanar
Test Voltage:	DC 5V		



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	0.103	16.46	20.43	0.02	0.00	36.91	107.32	-70.41	Peak
2	0.126	22.37	19.98	0.03	0.00	42.38	105.64	-63.26	Peak
3	0.153	25.93	20.21	0.03	0.00	46.17	103.95	-57.78	Peak
4	0.373	23.53	20.65	0.06	0.00	44.24	96.18	-51.94	Peak
5	0.464	23.96	20.76	0.07	0.00	44.79	94.28	-49.49	Peak
6	0.939	24.43	20.53	0.11	0.00	45.07	68.16	-23.09	Peak

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

2. The emission levels of 9 kHz~150 kHz are background noise and very lower than the limit, so not show in test report.

------End of report------