

TEST REPORT

Product : Simple remote
Trade mark : E.shine Systems Limited
Model/Type reference : See section 5.2
Serial Number : N/A
Report Number : EED32Q81904401
FCC ID : 2BMT4-RDPRO
Date of Issue : Apr. 29, 2025
Test Standards : 47 CFR Part 15 Subpart C
Test result : PASS

Prepared for:

E.shine Systems Limited

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2 Version

Version No.	Date	Description
00	Apr. 29, 2025	Original

3 Test Summary

Test Item	Test Requirement	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	PASS
DTS Bandwidth	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	PASS
Maximum Conducted Output Power	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	PASS
Maximum Power Spectral Density	47 CFR Part 15 Subpart C Section 15.247 (e)	PASS
Band Edge Measurements	47 CFR Part 15 Subpart C Section 15.247(d)	PASS
Conducted Spurious Emissions	47 CFR Part 15 Subpart C Section 15.247(d)	PASS
Radiated Spurious Emission & Restricted bands	47 CFR Part 15 Subpart C Section 15.205/15.209	PASS
Remark: Model No.: RDPRO1500, RDPRO1000, RDPRO750, RDPRO300, Rouge Ultimate, Helsi Max, Solace 1500, Refine 900, Kala Titan, Rouge Max, Helsi Pro, Solace 1000, Refine 600, Kala Duo Pro, Rouge Pro, Helsi Plus, Refine 360, Solace 750, Kala Apex, Rouge Tabletop, Helsi Mini, Solace 300, Refine 180, Kala Core Only the model RDPRO1500 was tested, They have the same electrical, PCB and layout and internal wiring were identical for the above models, only the model name are difference.		

4 General Information

4.1 Client Information

Applicant:	E.shine Systems Limited
Address of Applicant:	9th-10th floors, Building 3, No.128 Shajing Shangnan East Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China 518125
Manufacturer:	E.shine Systems Limited
Address of Manufacturer:	9th-10th floors, Building 3, No.128 Shajing Shangnan East Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China 518125
Factory:	E.shine Systems Limited
Address of Factory:	9th-10th floors, Building 3, No.128 Shajing Shangnan East Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China 518125

4.2 General Description of EUT

Product Name:	Simple remote		
Model No.:	RDPRO1500, RDPRO1000, RDPRO750, RDPRO300, Rouge Ultimate, Helsi Max, Solace 1500, Refine 900, Kala Titan, Rouge Max, Helsi Pro, Solace 1000, Refine 600, Kala Duo Pro, Rouge Pro, Helsi Plus, Refine 360, Solace 750, Kala Apex, Rouge Tabletop, Helsi Mini, Solace 300, Refine 180, Kala Core		
Test Model No.:	RDPRO1500		
Trade mark:	E.shine Systems Limited		
Product Type:	☐ Mobile ☒ Portable ☐ Fix Location		
Operation Frequency:	2420MHz~2460MHz		
Modulation Type:	GFSK		
Number of Channel:	3		
Antenna Type:	PCB Antenna		
Antenna Gain:	-1.96dBi		
Power Supply:	Battery:	DC 3.7V	
Test Voltage:	DC 3.7V		
Sample Received Date:	Mar. 13, 2025		
Sample tested Date:	Mar. 13, 2025 to Mar. 25, 2025		

Channel	Frequency (MHz)
1	2420
2	2440
3	2460

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency(MHz)
The lowest channel (CH1)	2420
The middle channel (CH2)	2440
The highest channel (CH3)	2460

4.3 Test Configuration

EUT Test Software Settings:			
Test Software:		N/A	
EUT Power Grade:		Default (Power level is built-in set parameters and cannot be changed and selected)	
Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.			
Test Mode	Modulation	Channel	Frequency(MHz)
Mode a	GFSK	CH1	2420
Mode b	GFSK	CH2	2440
Mode c	GFSK	CH3	2460

4.4 Test Environment

Operating Environment:	
Radiated Spurious Emissions:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
Conducted Emissions:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar
RF Conducted:	
Temperature:	22~25.0 °C
Humidity:	50~55 % RH
Atmospheric Pressure:	1010mbar

4.5 Description of Support Units

The EUT has been tested independently.

4.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd
Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China
Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385
No tests were sub-contracted.
FCC Designation No.: CN1164

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.46dB (30MHz-1GHz)
		0.55dB (1GHz-40GHz)
3	Radiated Spurious emission test	3.3dB (9kHz-30MHz)
		4.3dB (30MHz-1GHz)
		4.5dB (1GHz-18GHz)
		3.4dB (18GHz-40GHz)
4	Conduction emission	3.5dB (9kHz-150kHz)
		3.1dB (150kHz-30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%

5 Equipment List

RF test system					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Communication test set	R&S	CMW500	107929	06-26-2024	06-25-2025
Signal Generator	R&S	SMBV100A	1407.6004K02- 262149-CV	09-02-2024	09-01-2025
Spectrum Analyzer	R&S	FSV40	101200	07-18-2024	07-17-2025
RF control unit(power unit)	MWRF-test	MW100-RFCB	MW220620CTI-42	06-25-2024	06-24-2025
High-low temperature test chamber	Dong Guang Qin Zhuo	LK-80GA	QZ20150611879	11-30-2024	11-29-2025
Temperature/ Humidity Indicator	biaozhi	HM10	1804186	05-29-2024	05-28-2025
BT&WI-FI Automatic test software	MWRF-test	MTS 8310	V2.0.0.0	---	---
Spectrum Analyzer	R&S	FSV3044	101509	02-14-2025	02-13-2026

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
				(mm-dd-yyyy)	(mm-dd-yyyy)
Receiver	R&S	ESCI	100435	04-18-2024	04-17-2025
Temperature/ Humidity Indicator	Defu	TH128	/	04-25-2024	04-24-2025
LISN	R&S	ENV216	100098	09-19-2024	09-18-2025
Barometer	changchun	DYM3	1188	---	---
Test software	Fara	EZ-EMC	EMC-CON 3A1.1	---	---
Capacitive voltage probe	Schwarzbeck	CVP 9222C	00124	06-18-2024	06-17-2025
ISN	TESEQ	ISN T800	30297	12-05-2024	12-04-2025

3M Semi-anechoic Chamber (2)- Radiated disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
				(mm-dd-yyyy)	(mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	05/22/2022	05/21/2025
Receiver	R&S	ESC17	100938-003	09/07/2024	09/06/2025
Spectrum Analyzer	R&S	FSV40	101200	07/18/2024	07/17/2025
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	9163-618	05/22/2022	05/21/2025
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04/16/2024	04/15/2025
Microwave Preamplifier	Tonscend	EMC051845SE	980380	12/05/2024	12/04/2025
Horn Antenna	A.H.SYSTEMS	SAS-574	374	07/02/2023	07/01/2026
Horn Antenna	ETS-LINGREN	BBHA 9120D	9120D-1869	04/16/2024	04/15/2025
Preamplifier	Agilent	11909A	12-1	03/22/2024 03/03/2025	03/21/2025 03/02/2026
Preamplifier	CD	PAP-1840-60	6041.6042	06/19/2024	06/18/2025
Test software	Fara	EZ-EMC	EMEC-3A1-Pre	---	---
Cable line	Fulai(7M)	SF106	5219/6A	05/22/2022	05/21/2025
Cable line	Fulai(6M)	SF106	5220/6A	05/22/2022	05/21/2025
Cable line	Fulai(3M)	SF106	5216/6A	05/22/2022	05/21/2025
Cable line	Fulai(3M)	SF106	5217/6A	05/22/2022	05/21/2025

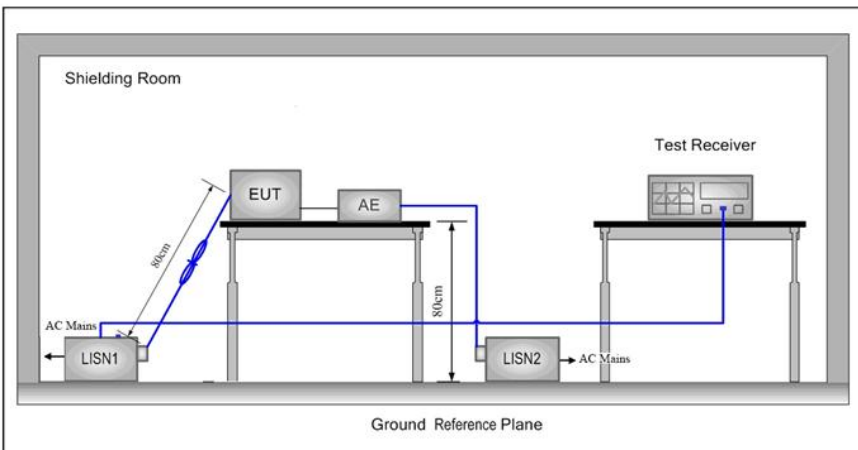
3M full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Fully Anechoic Chamber	TDK	FAC-3	---	01-09-2024	01-08-2027
Receiver	Keysight	N9038A	MY57290136	01-04-2025	01-03-2026
Spectrum Analyzer	Keysight	N9020B	MY57111112	01-14-2025	01-13-2026
Spectrum Analyzer	Keysight	N9030B	MY57140871	01-14-2025	01-13-2026
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-1148	04-28-2024	04-27-2025
Horn Antenna	Schwarzbeck	BBHA 9170	9170-832	04-16-2024	04-15-2025
Horn Antenna	ETS-LINDGREN	3117	57407	07-03-2024	07-02-2025
Preamplifier	EMCI	EMC001330	980563	03-03-2025	03-02-2026
Preamplifier	Tonscend	TAP-011858	AP21B806112	07-18-2024	07-17-2025
Preamplifier	Tonscend	EMC051845SE	980380	12-05-2024	12-04-2025
Communication test set	R&S	CMW500	102898	01-04-2025	01-03-2026
Temperature/ Humidity Indicator	biaozhi	GM1360	EE1186631	04-07-2024	04-06-2025
RSE Automatic test software	JS Tonscend	JS36-RSE	V4.0.0.0	---	---
Cable line	Times	SFT205-NMSM-2.50M	394812-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	394812-0002	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	394812-0003	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-2.50M	393495-0001	01-09-2024	01-08-2027
Cable line	Times	EMC104-NMNM-1000	SN160710	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-3.00M	394813-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMNM-1.50M	381964-0001	01-09-2024	01-08-2027
Cable line	Times	SFT205-NMSM-7.00M	394815-0001	01-09-2024	01-08-2027
Cable line	Times	HF160-KMKM-3.00M	393493-0001	01-09-2024	01-08-2027

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	Please see Internal photos
The antenna is PCB antenna. The best case gain of the antenna is -1.96dBi.	

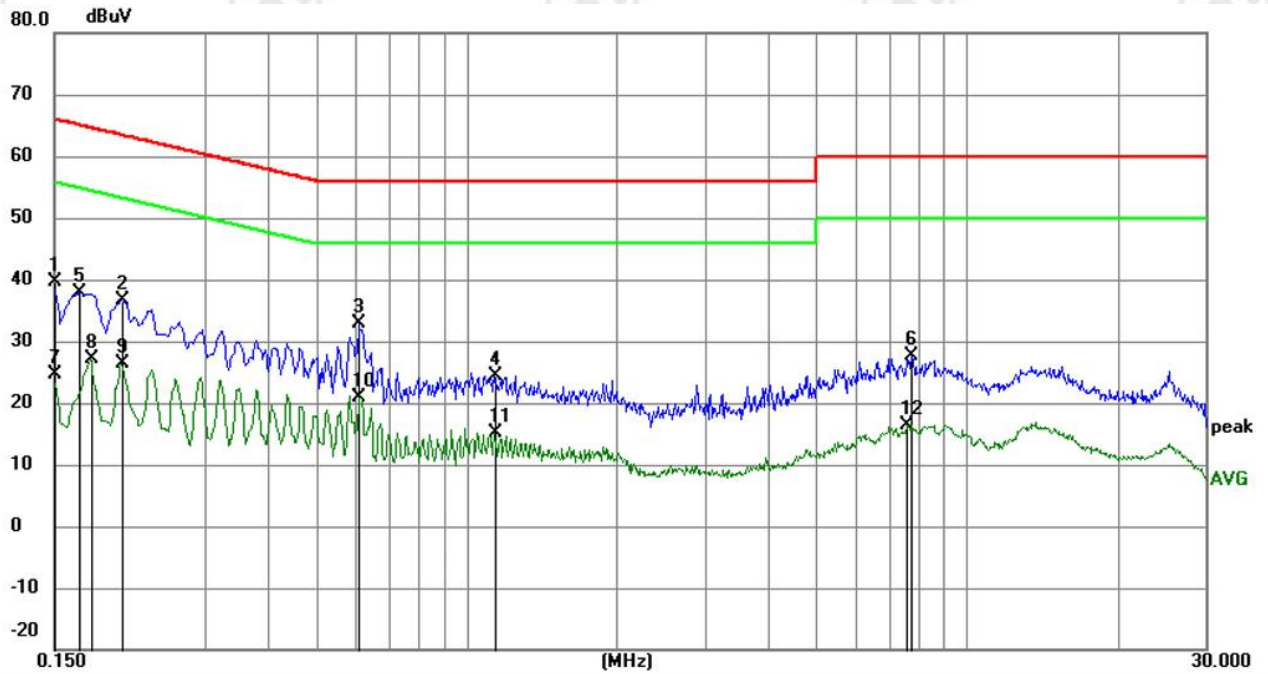
6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Setup:			
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) 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: 2013 on conducted measurement.		
Test Mode:	All modes were tested, only the worst case mode a was recorded in the report.		

Test Results: Pass

Measurement Data

Live line:

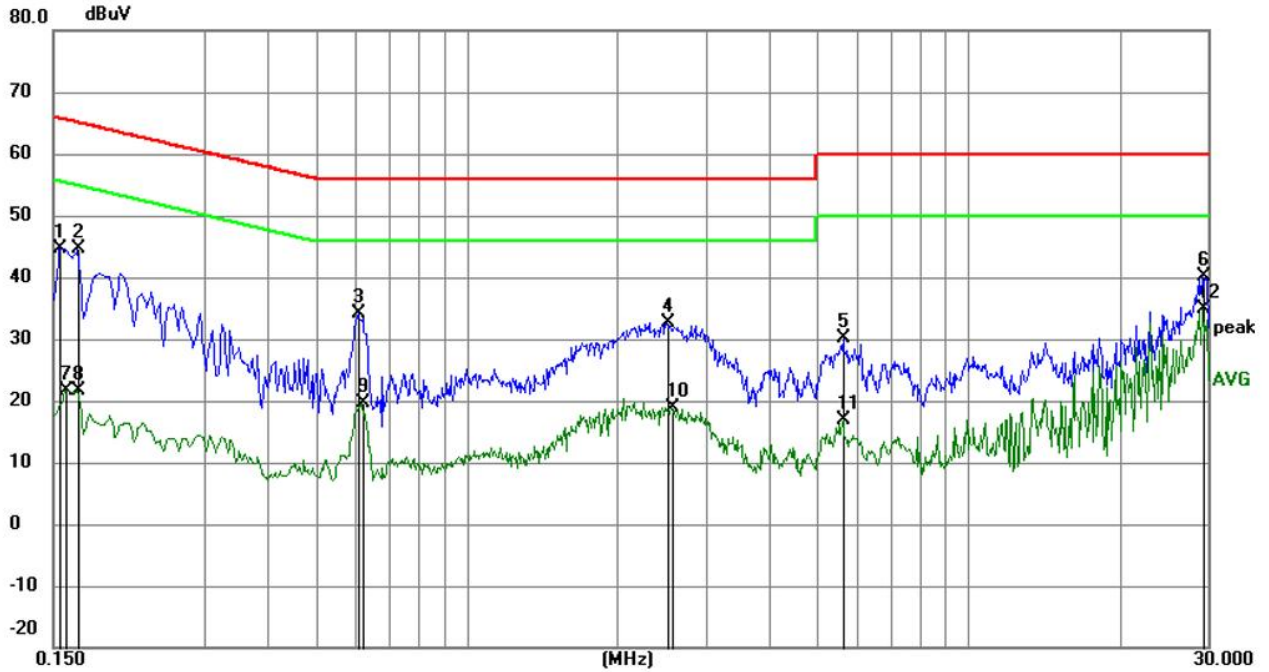


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	29.38	10.28	39.66	66.00	-26.34	QP	
2		0.2040	26.30	10.21	36.51	63.45	-26.94	QP	
3	*	0.6090	22.85	10.10	32.95	56.00	-23.05	QP	
4		1.1400	14.27	10.18	24.45	56.00	-31.55	QP	
5		0.1680	27.53	10.26	37.79	65.06	-27.27	QP	
6		7.7685	17.67	10.01	27.68	60.00	-32.32	QP	
7		0.1500	14.25	10.28	24.53	56.00	-31.47	AVG	
8		0.1770	16.78	10.24	27.02	54.63	-27.61	AVG	
9		0.2040	16.08	10.21	26.29	53.45	-27.16	AVG	
10		0.6090	10.77	10.10	20.87	46.00	-25.13	AVG	
11		1.1400	5.02	10.18	15.20	46.00	-30.80	AVG	
12		7.5795	6.43	10.01	16.44	50.00	-33.56	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1545	34.32	10.28	44.60	65.75	-21.15	QP	
2		0.1680	34.26	10.26	44.52	65.06	-20.54	QP	
3		0.6090	23.96	10.10	34.06	56.00	-21.94	QP	
4		2.5080	22.49	10.15	32.64	56.00	-23.36	QP	
5		5.6490	20.06	10.05	30.11	60.00	-29.89	QP	
6		29.2965	30.26	9.82	40.08	60.00	-19.92	QP	
7		0.1590	11.48	10.27	21.75	55.52	-33.77	AVG	
8		0.1680	11.35	10.26	21.61	55.06	-33.45	AVG	
9		0.6180	9.40	10.11	19.51	46.00	-26.49	AVG	
10		2.5574	8.85	10.15	19.00	46.00	-27.00	AVG	
11		5.6490	6.82	10.05	16.87	50.00	-33.13	AVG	
12	*	29.2965	25.15	9.82	34.97	50.00	-15.03	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.