

Suzhou Pineapple Health Technology Co., Ltd.

TEST REPORT

SCOPE OF WORK:

FCC Part 15 subpart B – EMC report

Model:

Lightsaber, U1

REPORT NUMBER

200700895SHA-003

ISSUE DATE

September 24, 2020

DOCUMENT CONTROL NUMBER

TTRFFCCPART15b_V1

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Report no. 200700895SHA-003

Applicant : Suzhou Pineapple Health Technology Co., Ltd.
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China

Manufacturer : Same as applicant

Manufacturing site : Same as applicant

Summary

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2019): Radio Frequency Devices (Subpart B)

ANSI C63.4 (2014): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

PREPARED BY:

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Reviewer

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Revision History

Report No.	Version	Description	Issued Date
200700895SHA-003	Rev. 01	Initial issue of report	September 24, 2020

Measurement result summary

TEST ITEM	FCC REFERENCE	TEST RESULT	NOTE
Conducted emission	15.107	Pass	
Radiation emission	15.109	Pass	

Notes: 1: NA =Not Applicable

2. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name : Hand-held massager
Type/Model : Lightsaber, U1
Description of EUT : We tested it, and listed the worst data.
Rating : Power adapter:
Input: 100-240V~ 50/60Hz; Output: 24VDC, 1A; Class II
Massager: 24VDC, 1A
Brand name : BOOSTER
Category of EUT : Class B
EUT type : ☒ Table top
☐ Floor standing
Sample received date : September 22, 2020
Sample identification No. : 0200922-20
Date of test : September 23, 2020

1.2 Description of Test Facility

Name : Intertek Testing Services Shanghai
Address : Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R.
China
Telephone : 86 21 61278200
Telefax : 86 21 54262353

The test facility is : CNAS Accreditation Lab
recognized, certified, Registration No. CNAS L0139
or accredited by these FCC Accredited Lab
organizations Designation Number: CN1175
IC Registration Lab
CAB identifier.: CN0051
VCCI Registration Lab
Registration No.: R-14243, G-10845, C-14723, T-12252
A2LA Accreditation Lab
Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019): Radio Frequency Device: Subpart B

ANSI C63.4 (2014): Interim Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz.

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description

2.5 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Conducted emission	24	42	101
Radiated Emission	24	42	101

Notes: NA =Not Applicable

2.6 Instrument list

Conducted Emission / Disturbance Power / Tri-loop Test / CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2021-07-8
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2021-11-10
<input checked="" type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2021-01-12
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2021-09-16
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2021-9-25
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2021-07-14
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2021-03-3
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3481	2021-01-05
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 4620	2021-09-9

2.7 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted emission at mains ports	9kHz ~ 150kHz	3.71 dB
	150kHz ~ 30MHz	3.31 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.04 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.97 dB
	6GHz ~ 18GHz	5.29 dB

3 Conducted emission

Test result: **PASS**

3.1 Limits


3.1.1 Limits for conducted emission of class A device

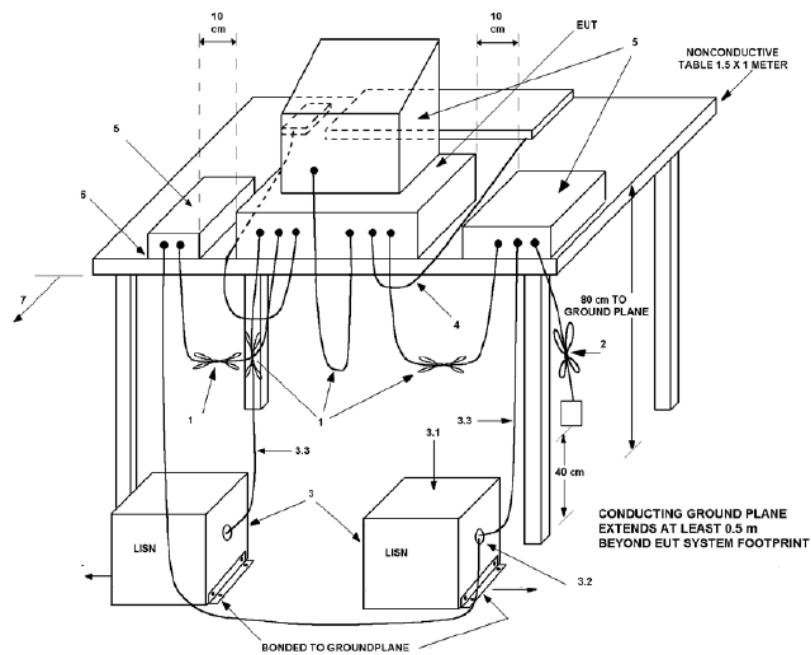
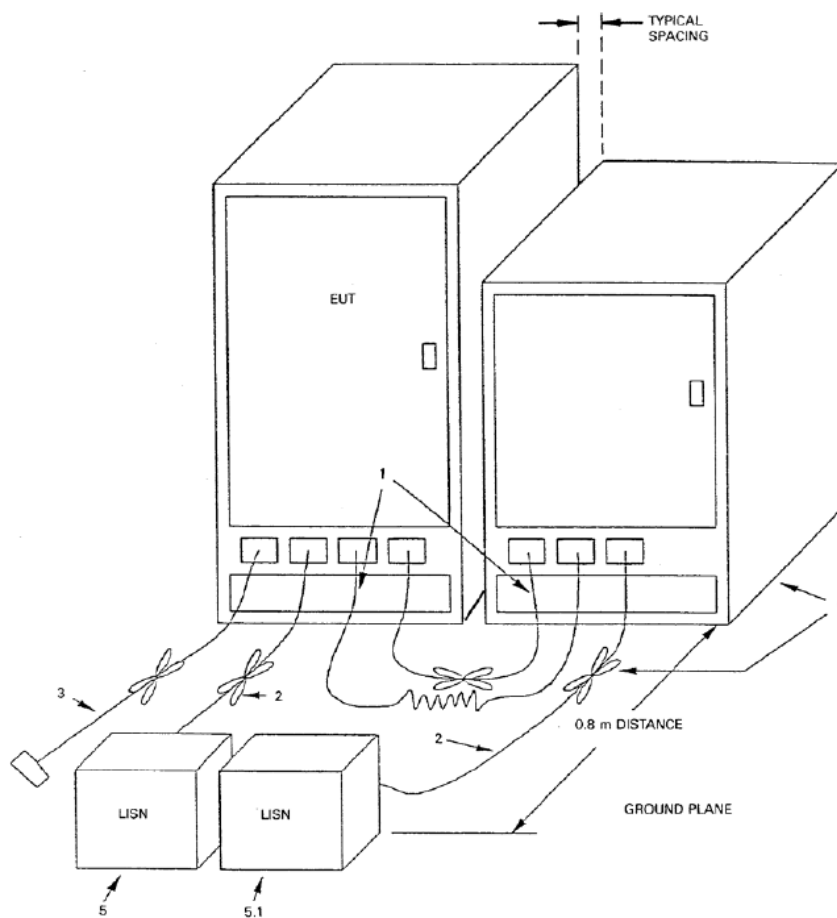
Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.1.2 Limits for conducted emission of class B device

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50
Note: 1. * Means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz 2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.2 Test setup

 For table top equipment

☐ For floor standing equipment

3.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were following clause 4 and clause 5 of ANSI 63.4.

Detailed test procedure was following clause 7.3 of ANSI 63.4.

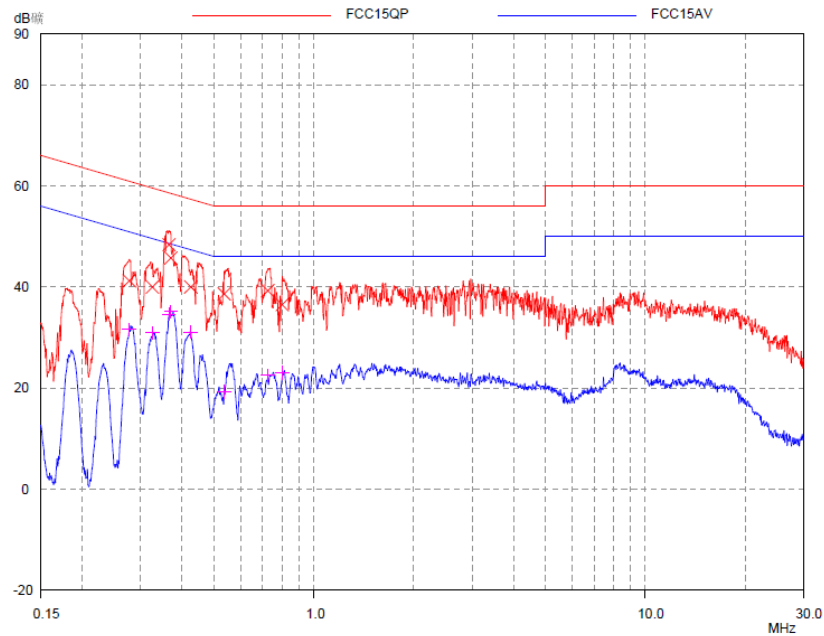
EUT arrangement and operation conditions were according to clause 6 and clause 7 of ANSI 63.4.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

3.4 Test Protocol

Charging mode

L line:

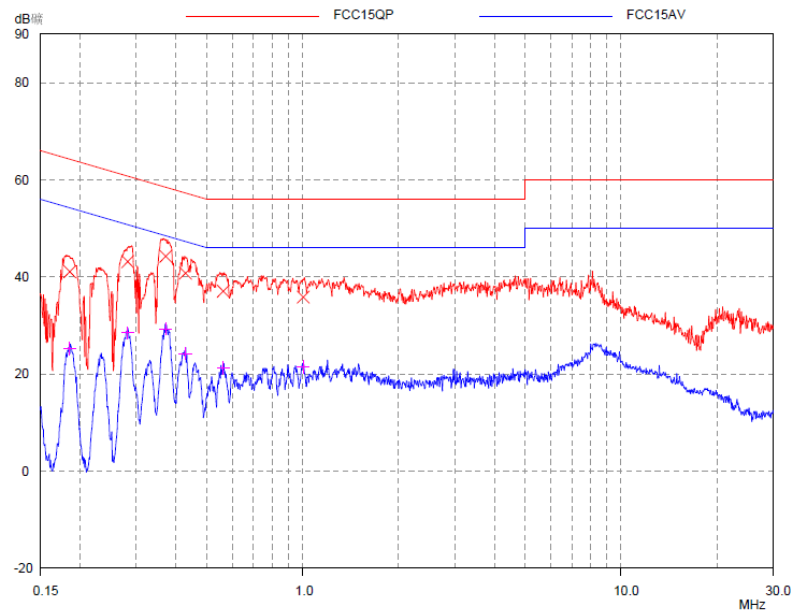


Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.27738	41.22	60.89	19.67
0.32541	39.98	59.57	19.59
0.36535	48.37	58.61	10.24
0.36975	45.73	58.51	12.78
0.42519	40.02	57.35	17.33
0.53597	38.64	56.00	17.36
0.72595	39.25	56.00	16.75
0.80214	36.48	56.00	19.52

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.27738	31.56	50.89	19.33
0.32541	30.91	49.57	18.66
0.36535	34.66	48.61	13.95
0.36975	35.08	48.51	13.43
0.42519	31.08	47.35	16.27
0.53597	19.25	46.00	26.75
0.72595	22.51	46.00	23.49
0.80214	23.02	46.00	22.98

N line:



Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB
0.18534	41.08	64.24	23.16
0.28184	43.16	60.76	17.60
0.37123	44.24	58.47	14.23
0.4286	40.78	57.28	16.50
0.56227	37.08	56.00	18.92
1.00308	35.86	56.00	20.14

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB
0.18534	25.22	54.24	29.02
0.28184	28.52	50.76	22.24
0.37123	29.32	48.47	19.15
0.4286	24.18	47.28	23.10
0.56227	21.23	46.00	24.77
1.00308	21.47	46.00	24.53

- Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
 Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
 Then Correct Factor = 10.00 + 2.00 = 12.00dB;
 Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
 Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

4 Radiated emission

Test result: **PASS**

4.1 Radiated emission limits

4.1.1 Limits for radiated emission of class A device

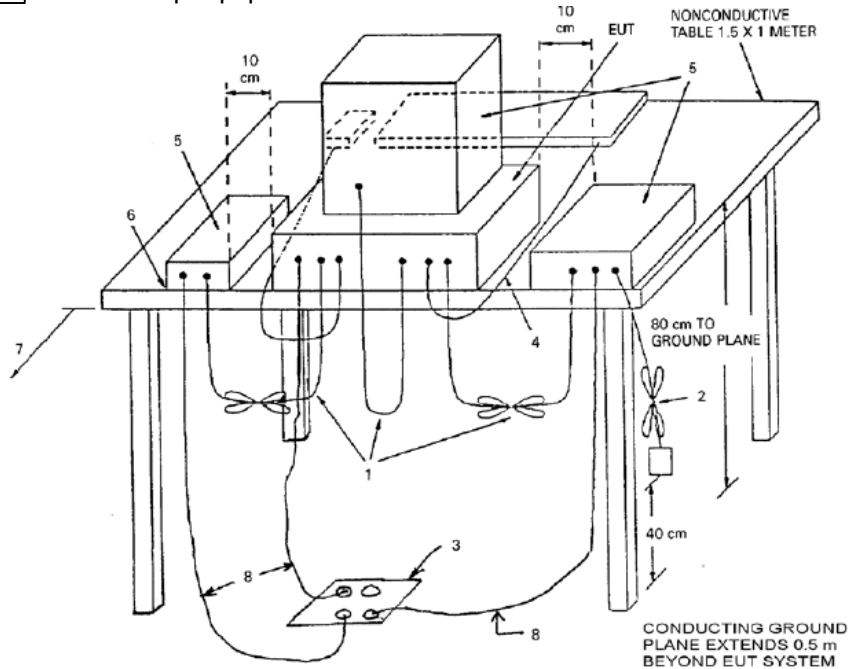
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 ~ 88	39
88 ~ 216	43.5
216 ~ 960	46.4
Above 960	49.5
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.1.2 Limits for radiated emission of class B device

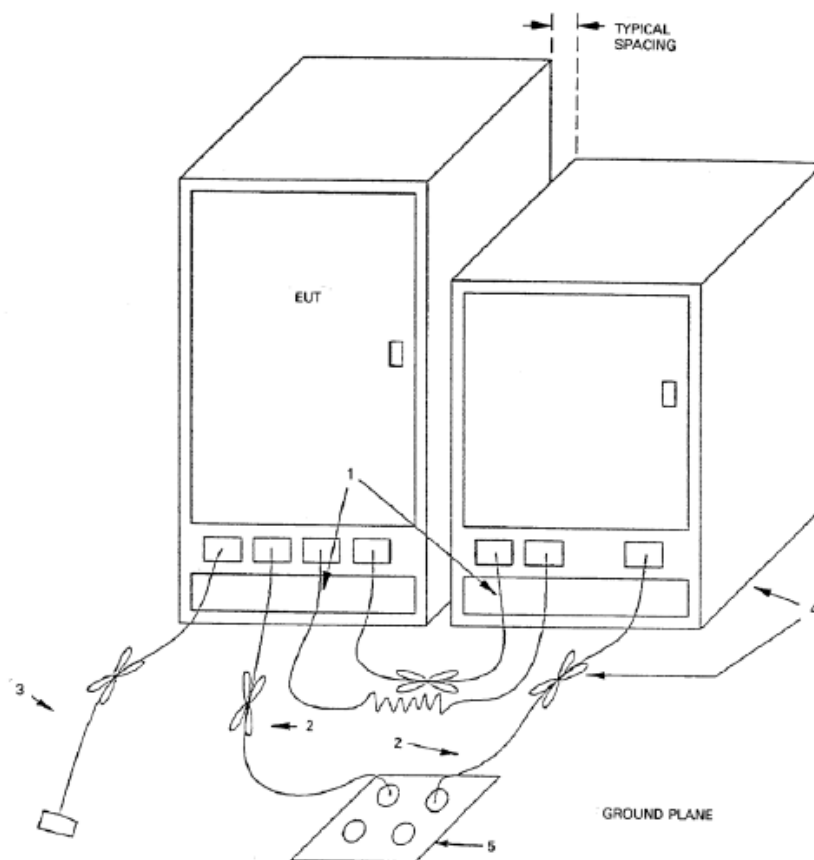
Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m
30 ~ 88	40.0
88 ~ 216	43.5
216 ~ 960	46.0
Above 960	54.0
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.	

4.2 Block diagram and test set up

☐ For table top equipment



☒ For floor standing equipment



4.3 Test Setup and Test Procedure

The measurement was performed in a semi-anechoic chamber.

The distance from EUT to receiving antenna is 3 meter.

Measurement was performed according to clause 4 and clause 5 of ANSI 63.4.

Test procedure was according to clause 8.3 of ANSI 63.4.

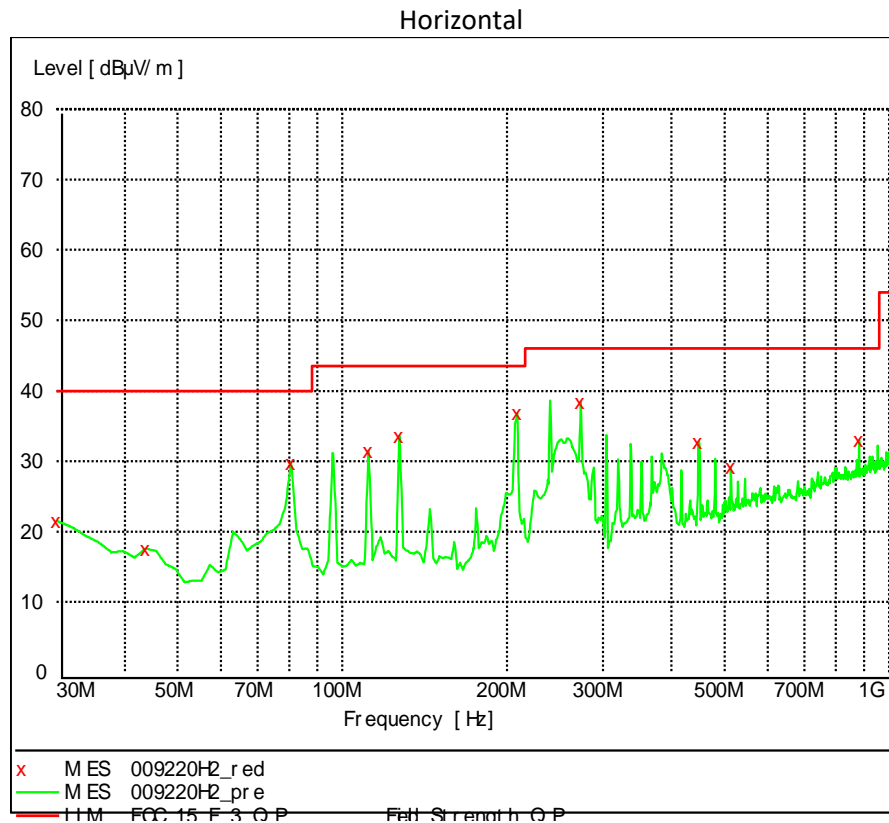
EUT arrangement and operate condition were according to clause 6 and clause 8 of ANSI 63.4.

The bandwidth setting on R&S Test Receiver was 120 kHz.

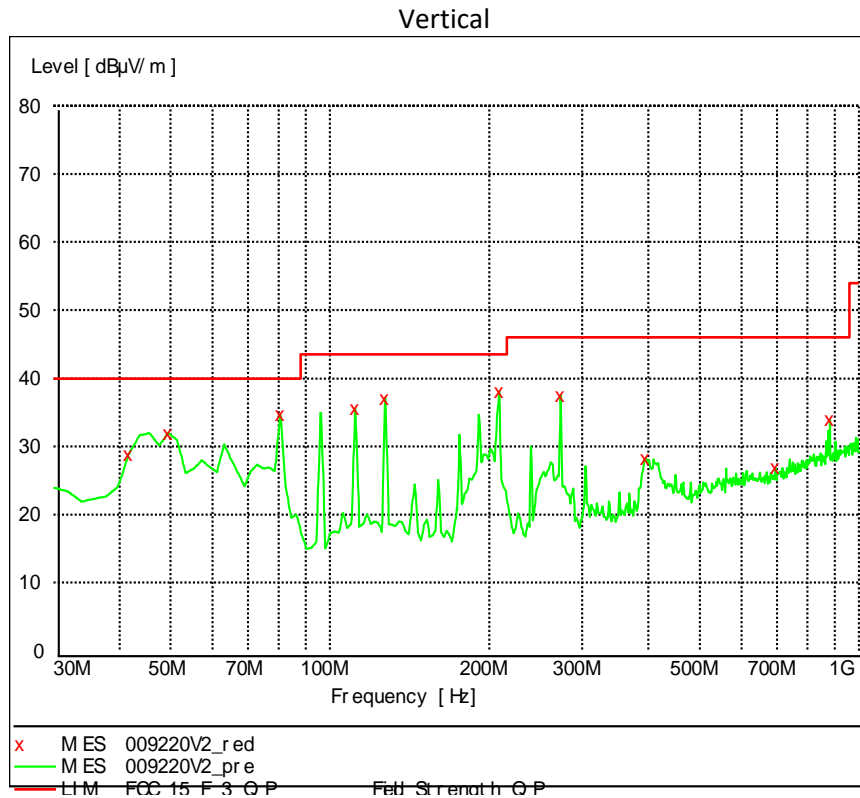
The required measurement frequency range was checked.

4.4 Test Protocol

Test Curve:
Charging mode

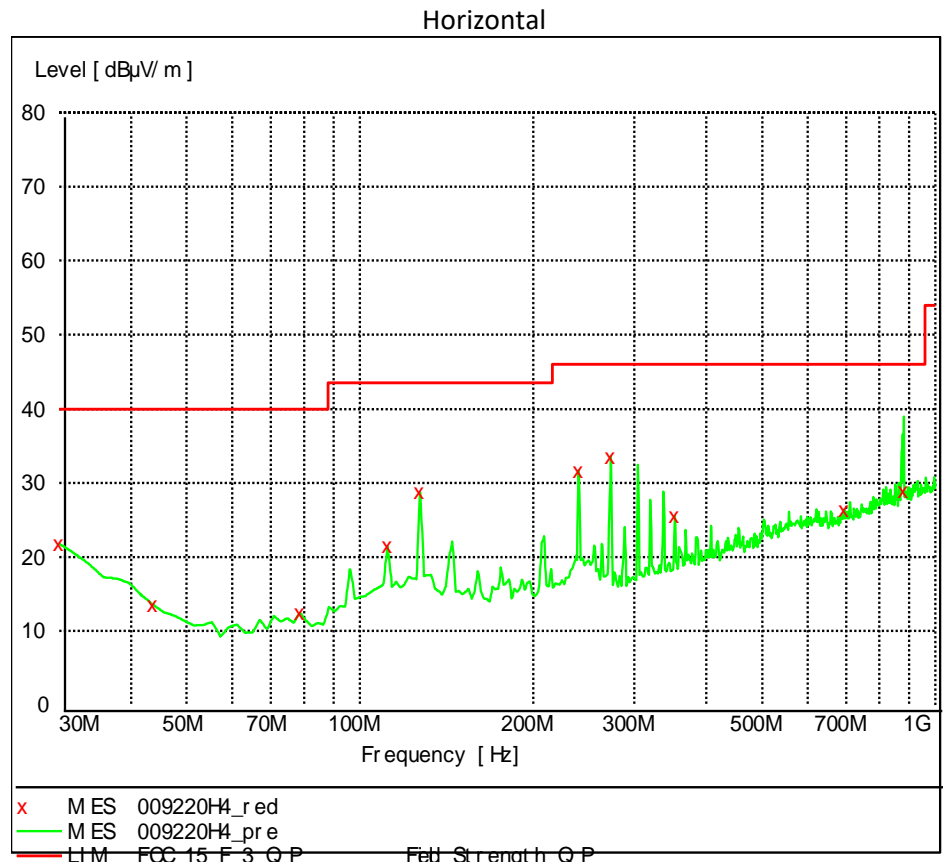


Frequency	Level	Transd	Limit	Margin
MHz	<u>dBuV/m</u>	<u>dB</u>	<u>dBuV/m</u>	dB
30.000000	21.50	19.4	40.0	18.5
43.607214	17.60	11.9	40.0	22.4
80.541082	29.80	8.1	40.0	10.2
111.643287	31.50	12.7	43.5	12.0
127.194389	33.60	13.0	43.5	9.9
208.837675	36.80	10.8	43.5	6.7
272.985972	38.40	14.6	46.0	7.6
447.935872	32.70	18.6	46.0	13.3
514.028056	29.20	19.8	46.0	16.8
881.422846	33.00	23.5	46.0	13.0

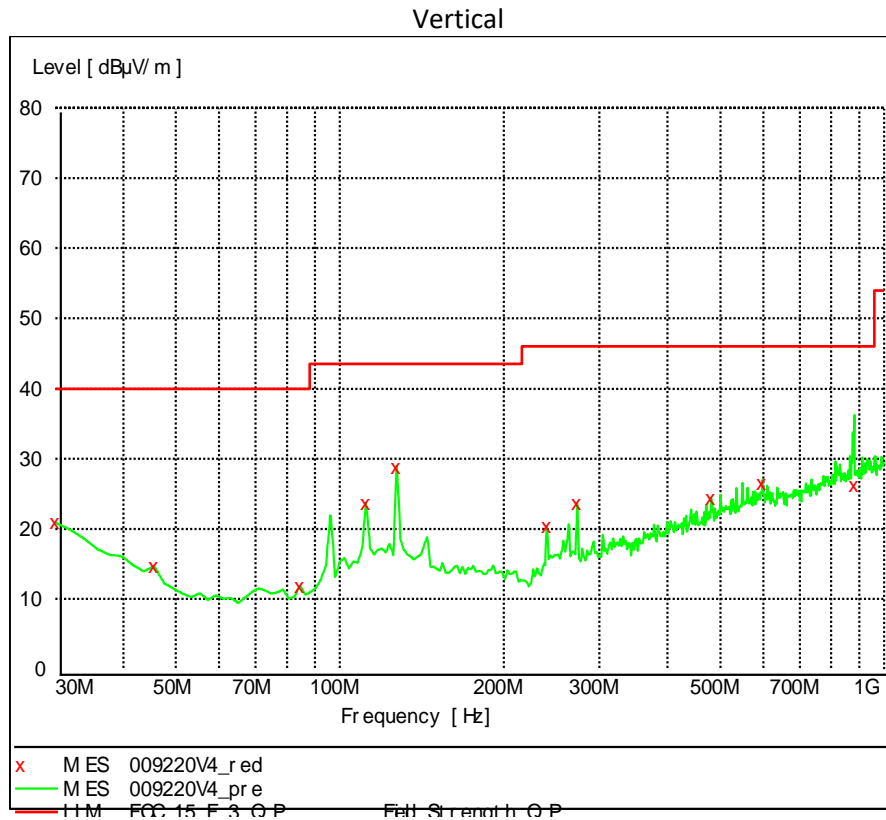


Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
41.663327	28.90	12.8	40.0	11.1
49.438878	32.00	9.2	40.0	8.0
80.541082	34.70	8.1	40.0	5.3
111.643287	35.60	12.7	43.5	7.9
127.194389	37.10	13.0	43.5	6.4
208.837675	38.10	10.8	43.5	5.4
272.985972	37.50	14.6	46.0	8.5
395.450902	28.20	17.4	46.0	17.8
694.809619	26.90	21.5	46.0	19.1
881.422846	33.90	23.5	46.0	12.1

Discharging mode



Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
30.000000	21.80	19.4	40.0	18.2
43.607214	13.60	11.9	40.0	26.4
78.597194	12.50	7.9	40.0	27.5
111.643287	21.50	12.7	43.5	22.0
127.194389	28.80	13.0	43.5	14.7
239.939880	31.70	12.7	46.0	14.3
272.985972	33.60	14.6	46.0	12.4
352.685371	25.60	16.3	46.0	20.4
694.809619	26.40	21.5	46.0	19.6
881.422846	29.00	23.5	46.0	17.0

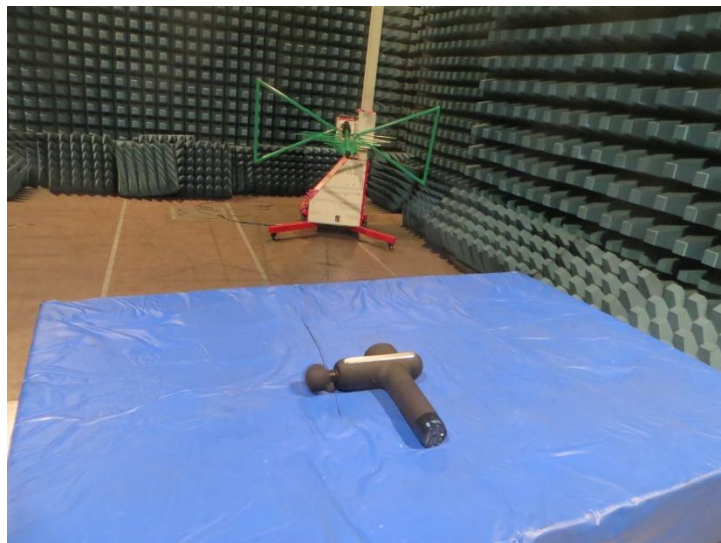
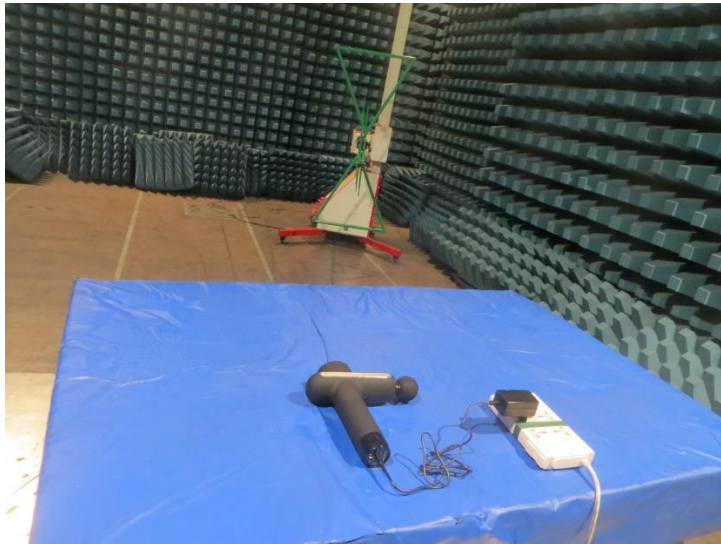


Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB
30.000000	20.90	19.4	40.0	19.1
45.551102	14.70	10.9	40.0	25.3
84.428858	11.90	8.9	40.0	28.1
111.643287	23.70	12.7	43.5	19.8
127.194389	28.90	13.0	43.5	14.6
239.939880	20.40	12.7	46.0	25.6
272.985972	23.70	14.6	46.0	22.3
480.981964	24.40	19.2	46.0	21.6
597.615230	26.60	20.9	46.0	19.4
881.422846	26.20	23.5	46.0	19.8

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV, limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV +
 0.20dB/m = 10.20dBuV/m; Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

Appendix I: Photograph of Test setup



Appendix II: Photograph of equipment under test

Photo 1.

Description: Model Lightsaber



Photo 2.

Description: Model Lightsaber



Photo 3.

Description: Model Lightsaber



Photo 4.

Description: Control button



Photo 5.
Description: Model U1



Photo 6.
Description: Model U1



Photo 7.

Description: Detachable massage head



Photo 8.

Description: Battery assembly removed



Photo 9.

Description: Internal view



Photo 10.

Description: Battery



Photo 11.

Description: Internal view

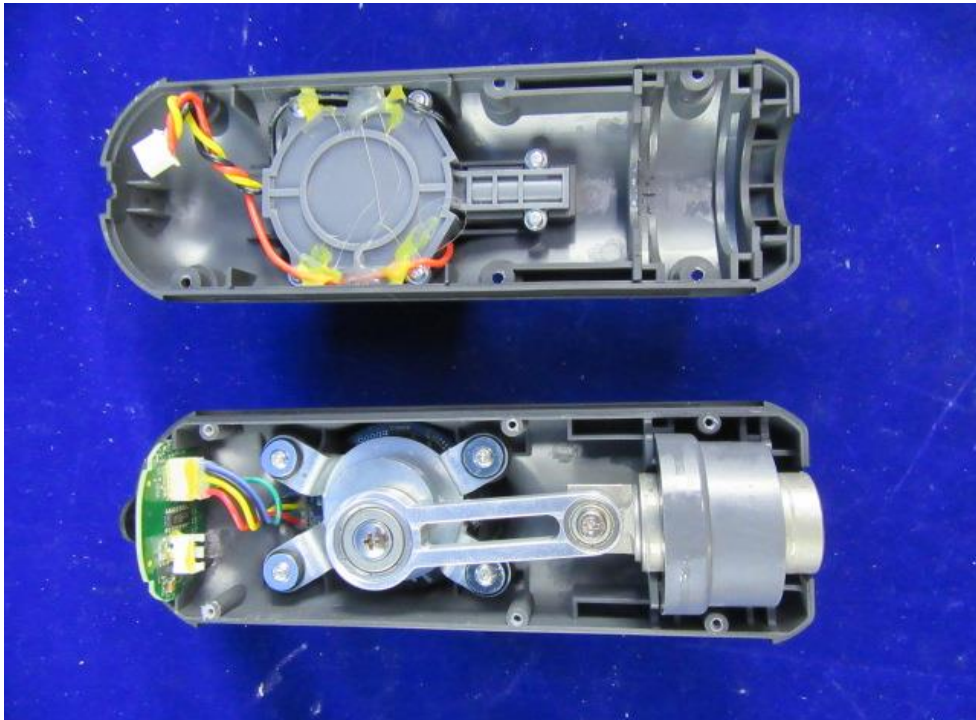


Photo 12.

Description: Motor





END of the report