

EMC TEST REPORT

For

Soma Medical (Sabah) Sdn Bhd (1248058-D)

UVGI AIR STERILIZER

Model No.:
SM 20

Prepared For : Soma Medical (Sabah) Sdn Bhd (1248058-D)
: Block E, Lot 28, 2nd floor, Signature Office, KK Times Square, Off Coastal Highway, 88400 Kota Kinabalu Sabah, Malaysia

Prepared By : Shenzhen PTSI Testing Co., Ltd.
: 2/F, Building C, Hongwan Commercial Center, Bao'an Road, Xixiang, Baoan, Shenzhen, China
Tel : +86-755-27820019
Fax: +86-755-27215519

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Date of Test : December 04, 2017 - December 12, 2017
Date of Report : December 12, 2017

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TEST REPORT VERIFICATION

Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)
Manufacturer : Soma Medical (Sabah) Sdn Bhd (1248058-D)
EUT : UVGI AIR STERILIZER
Model No. : SM 20
Input Voltage : 220-240V~, 50Hz, 960W

Measurement Procedure Used:

EN 55014-1:2006+A1:2009+A2:2011

EN 61000-3-2:2014

EN 61000-3-3:2013

EN 55014-2:2015

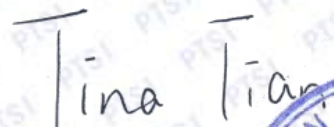
(EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11)

The device described above is tested by Shenzhen PTSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels that the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen PTSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is technically compliant with the EN 55014-1, EN 61000-3-2, EN 61000-3-3 and EN 55014-2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen PTSI Testing Co., Ltd.

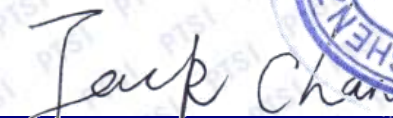
Prepared by

:


(Tina Tian, Engineer)

Reviewed by

:


(Jack Chan, Manager)



1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	: UVGI AIR STERILIZER
Model Number	: SM 20
Test Model Number	: SM 20
Remark:	--
Trade Mark	: SOMA MEDICAL
Power Supply	: 220-240V~, 50Hz, 960W
Applicant	: Soma Medical (Sabah) Sdn Bhd (1248058-D)
Address	: Block E, Lot 28, 2nd floor, Signature Office, KK Times Square, Off Coastal Highway, 88400 Kota Kinabalu Sabah, Malaysia
Manufacturer	: SOMA MEDICAL SDN BHD (671166-M)
Address	: 102, Lorong Maarof, Bangsar. 59000. Kuala Lumpur. MALAYSIA.
Date of Sample Receipt	: December 04, 2017 - December 12, 2017
Date of Test	: December 12, 2017

1.2 Measurement Uncertainty

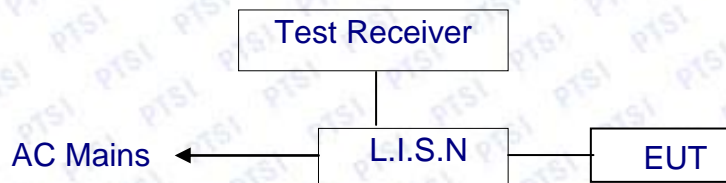
Radiation Emission Uncertainty	: $U_r = 3.3$
Conduction Emission Uncertainty	: $U_c = 2.8$
Power clamp Emission Uncertainty	: $U_c = 2.6$

2. MEASURING DEVICES AND TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	100137	2017-05-18	1 Year
2.	L.I.S.N	Rohde & Schwarz	ESH2-Z6	100253	2017-05-18	1 Year
3.	Pulse Limiter	Rohde & Schwarz	EMV216	100017	2017-05-18	1 Year
4.	50Ω Coaxial Switch	Anritsu	MP59B	6100175589	2017-05-18	1 Year
5.	Test Receiver	Rohde & Schwarz	ESCS30	100137	2017-05-18	1 Year
6.	Power Clamp	Rohde & Schwarz	MDS21	100220	2017-05-18	1 Year
7.	50Ω Coaxial Switch	Anritsu	MP59B	610017558	2017-05-18	1 Year
8.	Spectrum Analyzer	Rohde & Schwarz	ESCI	100137	2017-05-18	1 Year
9.	Test Receiver	Rohde & Schwarz	ESCI	100137	2017-05-18	1 Year
10.	Bilog Antenna	Schwarzbeck	VULB9163	143	2017-05-18	1 Year
11.	Power Amplifier	HP	8447F	OPT H64	2017-05-18	1 Year
12.	Positioning Controller	C&C LAB	CC-C-IF	N/A	2017-05-18	1 Year
13.	Color Monitor	SUNSP0	SP-140A	N/A	2017-05-18	1 Year
14.	Single Line Filter	JIANLI	XL-3	N/A	2017-05-18	1 Year
15.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	2017-05-18	1 Year
16.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	2017-05-18	1 Year
17.	DC Power Filter	JIANLI	DL-2X50B	N/A	2017-05-18	1 Year
18.	Cable	Schwarzbeck	PLF-100	N/A	2017-05-18	1 Year
19.	Cable	Rosenberger	CIL02	A0783566	2017-05-18	1 Year
20.	Cable	Rosenberger	AK9513	AC RX1	2017-05-18	1 Year
21.	Power Frequency Test System	EMTEST	DPA500	U0526100506	2017-05-18	1 Year
22.	PC	LENOVO	T2900D	SS12485803	N/A	N/A

3. POWER LINE CONDUCTED MEASUREMENT

3.1 Block Diagram of Test Setup



(EUT: UVGI AIR STERILIZER)

3.2 Conducted Power Line Emission Measurement Standard and Limits

3.2.1 Standard:

EN 55014-1:2006+A1:2009+A2:2011

3.2.2 Limits

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56 *	59 ~ 46 *
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

1. At the transition frequency the lower limit applies.
2. * decreasing linearly with logarithm of the frequency.

3.3 EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 55014-1 requirements and operated in a manner which tends to maximize its emission characteristics in a normal application.

EUT : UVGI AIR STERILIZER
 Model Number : SM 20
 Manufacturer : Soma Medical (Sabah) Sdn Bhd (1248058-D)

3.4 Operating Condition of EUT

- 3.4.1 Setup the EUT as shown in Section 3.1.
- 3.4.2 Turn on the power of all equipments.
- 3.4.3 Let the EUT work in measuring mode (ON) and measure it.

3.5 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission measurement.

The bandwidth of the test receiver (R&S ESCS30) is set at 200Hz in 9KHz~150KHz range and 9KHz in 150KHz~30MHz range.

All scanning waveform is attached in Appendix I.

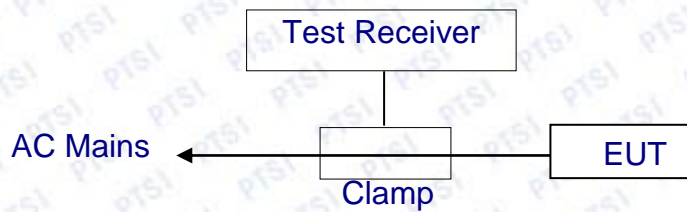
3.6 Measurement Results

PASS.

The frequency range from 150KHz to 30MHz is investigated.

4. DISTURBANCE POWER MEASUREMENT

4.1 Block Diagram of Test Setup



(EUT: UVGI AIR STERILIZER)

4.2 Measuring Standard

EN 55014-1:2006+A1:2009+A2:2011

4.3 Disturbance Power Limits

All emanations from devices or system shall not exceed the level of field strengths specified below:

4.3.1 (Table A)

Frequency MHz	Limits dB(pW)	
	Quasi-peak Value	Average Value
30 ~ 300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

4.3.2 (Table B)

Frequency MHz	Limits dB(pW)	
	Quasi-peak Value	Average Value
200 ~ 300	0 to 10 dB	-

4.4 EUT Configuration on Measurement

The EN 55014-1 Regulations test method must be used to find the maximum emission during radiated emission measurement. The configuration of the EUT is the same as used in conducted emission measurement.

4.5 Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.4 except the test set up replaced as Section 4.1.

4.6 Test Procedure

The EUT is placed on the plane 0.8m high above the ground by insulating support and away from other metallic surface at least 0.4m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

The bandwidth of the field strength meter (R&S TEST RECEIVER ESCS30) is set at 120kHz.

All scanning waveform is attached in Appendix II.

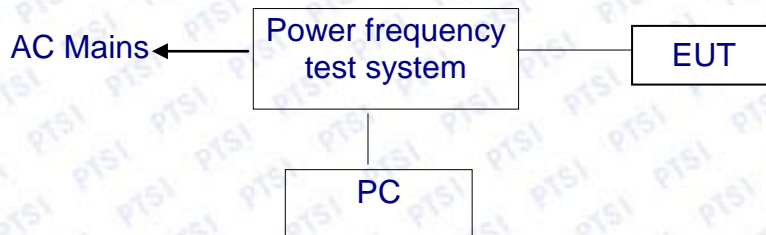
4.7 Measuring Results

PASS.

All scanning waveform is attached in Appendix II.

5. HARMONIC CURRENT MEASUREMENT

5.1 Block Diagram of Test Setup



(EUT: UVGI AIR STERILIZER)

5.2 Measuring Standard

EN 61000-3-2:2014 Class A

5.3 Operating Condition of EUT

Same as Section 3.4, except the test setup replaced by Section 5.1.

5.4 Test Results

Please refer to the following pages.

Test Report

Report Title	: Harmonics
Company Name	: Shenzhen PTSI Testing Co., Ltd.
Date of Test	: 17:35 December 07, 2017
Measurement File Name	: BWB691.rsd
Standard Used	: IEC 61000-3-2 Ed.3 Quasi-stationary Equipment class A <= 200% of the limit
Observation Time	: 150 s
Meter	: 230VAC / 50 Hz
Windows Width	: 10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008)
Applicant	: Soma Medical (Sabah) Sdn Bhd (1248058-D)
E. U. T.	: UVGI AIR STERILIZER
M/N	: SM 20
Mode	: ON

Test Result

EUT	: PASS
Power Source	: PASS

E.U.T. Result

Harmonic(s) > 200%

Order (n) : None

Harmonic(s) with average > 90%

Order (n) : None

Harmonic(s) between 150% and 200% during more than 10% of the test time or max. 10min

Order (n) : None

Power Source Result

First dataset out of limit

DS (time) : None

Harmonic(s) out of limit

Order (n) : None

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	5.247			
2	4.582E-3	0.471	972.00E-3	PASS
3	1.220	58.949	2.07	PASS
4	5.473E-3	1.414	387.00E-3	PASS
5	58.178E-3	5.670	1.03	PASS
6	9.595E-3	3.554	270.00E-3	PASS
7	57.589E-3	8.310	693.00E-3	PASS
8	43.245E-3	20.891	207.00E-3	PASS
9	9.591E-3	2.664	360.00E-3	PASS
10	41.314E-3	24.948	165.60E-3	PASS
11	13.245E-3	4.460	297.00E-3	PASS
12	7.815E-3	5.663	138.00E-3	PASS
13	6.126E-3	3.241	189.00E-3	PASS
14	4.774E-3	4.036	118.29E-3	PASS
15	10.681E-3	7.912	135.00E-3	PASS
16	5.845E-3	5.647	103.50E-3	PASS
17	42.918E-3	36.030	119.11E-3	PASS
18	4.664E-3	5.070	92.00E-3	PASS
19	37.444E-3	35.133	106.58E-3	PASS
20	5.897E-3	7.122	82.80E-3	PASS
21	7.521E-3	7.799	96.43E-3	PASS
22	3.625E-3	4.815	75.28E-3	PASS
23	4.393E-3	4.989	88.05E-3	PASS
24	5.739E-3	8.318	68.99E-3	PASS
25	4.400E-3	5.432	81.00E-3	PASS
26	18.953E-3	29.757	63.69E-3	PASS
27	3.913E-3	5.218	75.00E-3	PASS
28	17.706E-3	29.940	59.14E-3	PASS
29	4.218E-3	6.040	69.83E-3	PASS
30	5.059E-3	9.165	55.20E-3	PASS
31	3.613E-3	5.530	65.32E-3	PASS
32	3.308E-3	6.393	51.75E-3	PASS
33	7.111E-3	11.589	61.36E-3	PASS
34	5.937E-3	12.189	48.71E-3	PASS
35	29.344E-3	50.715	57.86E-3	PASS
36	7.755E-3	16.860	46.00E-3	PASS
37	28.368E-3	51.833	54.73E-3	PASS
38	7.797E-3	17.891	43.58E-3	PASS
39	5.869E-3	11.304	51.92E-3	PASS
40	3.663E-3	8.847	41.40E-3	PASS

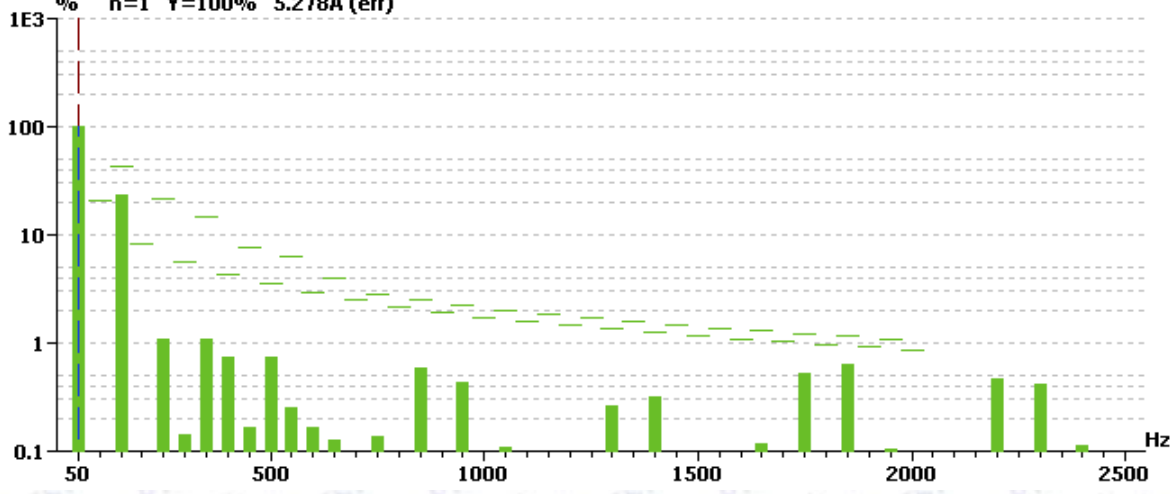
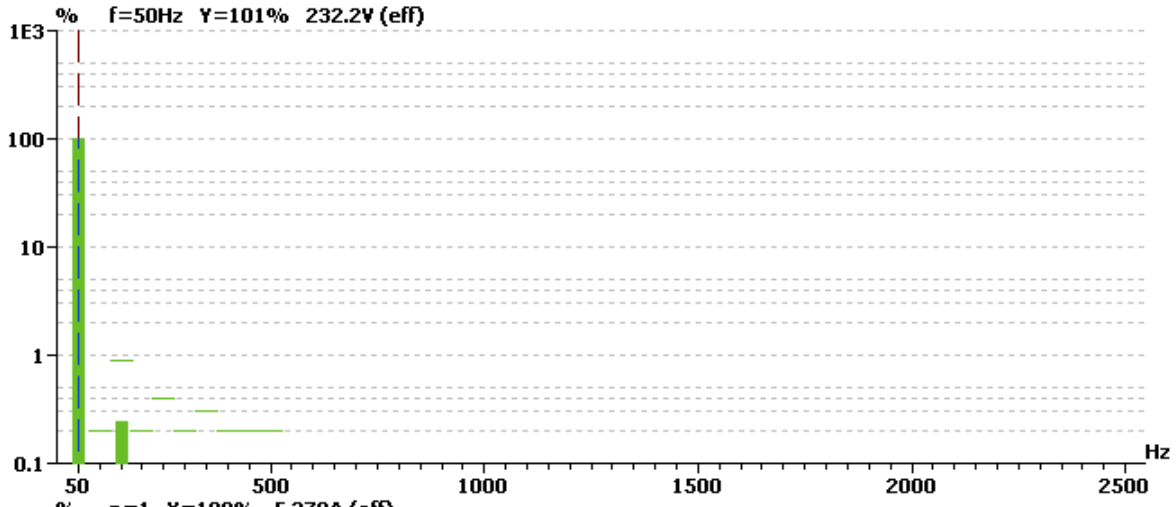
Maximum harmonic current results

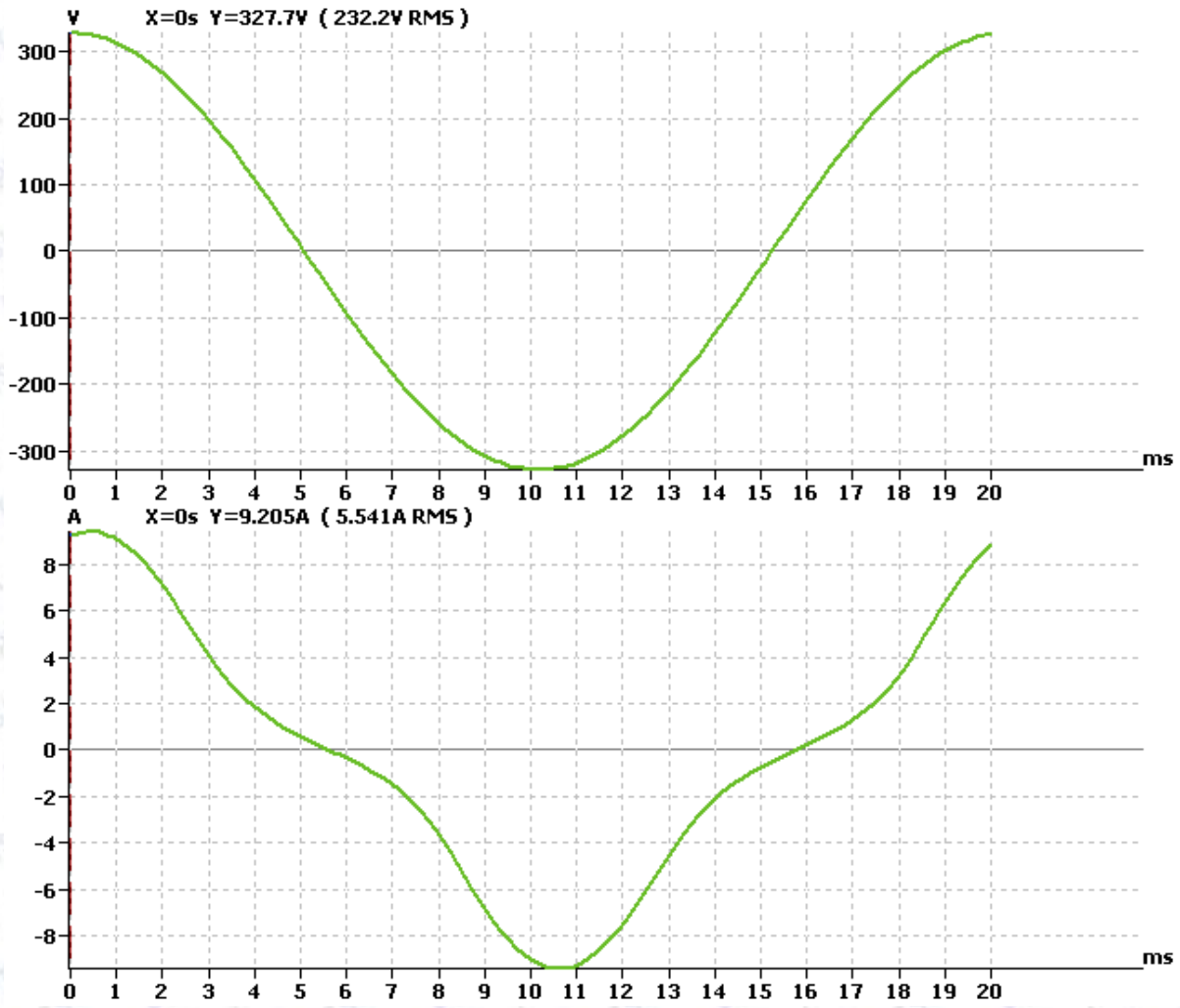
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	5.433			
2	10.142E-3	0.470	2.16	PASS
3	1.280	27.826	4.60	PASS
4	12.052E-3	1.401	860.00E-3	PASS
5	73.286E-3	3.214	2.28	PASS
6	21.390E-3	3.565	600.00E-3	PASS
7	64.602E-3	4.195	1.54	PASS
8	98.821E-3	21.483	460.00E-3	PASS
9	15.731E-3	1.966	800.00E-3	PASS
10	103.609E-3	28.155	368.00E-3	PASS
11	19.695E-3	2.984	660.00E-3	PASS
12	16.646E-3	5.428	306.66E-3	PASS
13	9.659E-3	2.300	420.00E-3	PASS
14	8.469E-3	3.222	262.86E-3	PASS
15	18.186E-3	6.062	300.00E-3	PASS
16	14.031E-3	6.101	230.00E-3	PASS
17	104.303E-3	39.404	264.70E-3	PASS
18	9.171E-3	4.486	204.44E-3	PASS
19	92.703E-3	39.142	236.84E-3	PASS
20	13.721E-3	7.457	184.00E-3	PASS
21	12.429E-3	5.800	214.28E-3	PASS
22	6.164E-3	3.685	167.28E-3	PASS
23	6.327E-3	3.234	195.66E-3	PASS
24	9.935E-3	6.480	153.32E-3	PASS
25	7.341E-3	4.078	180.00E-3	PASS
26	34.560E-3	24.417	141.54E-3	PASS
27	9.082E-3	5.449	166.66E-3	PASS
28	35.115E-3	26.720	131.42E-3	PASS
29	6.601E-3	4.253	155.18E-3	PASS
30	10.083E-3	8.220	122.66E-3	PASS
31	7.108E-3	4.896	145.16E-3	PASS
32	6.994E-3	6.082	115.00E-3	PASS
33	21.540E-3	15.796	136.36E-3	PASS
34	26.525E-3	24.506	108.24E-3	PASS
35	108.015E-3	84.006	128.58E-3	PASS
36	23.424E-3	22.915	102.22E-3	PASS
37	94.871E-3	78.006	121.62E-3	PASS
38	22.661E-3	23.401	96.84E-3	PASS
39	14.918E-3	12.929	115.38E-3	PASS
40	7.193E-3	7.818	92.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	232.30	101.001		
2	50.67E-3	0.022	0.2	PASS
3	566.89E-3	0.246	0.9	PASS
4	22.91E-3	0.010	0.2	PASS
5	44.93E-3	0.020	0.4	PASS
6	19.62E-3	0.009	0.2	PASS
7	57.31E-3	0.025	0.3	PASS
8	60.09E-3	0.026	0.2	PASS
9	39.48E-3	0.017	0.2	PASS
10	84.32E-3	0.037	0.2	PASS
11	77.39E-3	0.034	0.1	PASS
12	26.57E-3	0.012	0.1	PASS
13	84.32E-3	0.037	0.1	PASS
14	24.65E-3	0.011	0.1	PASS
15	94.29E-3	0.041	0.1	PASS
16	18.30E-3	0.008	0.1	PASS
17	157.90E-3	0.069	0.1	PASS
18	16.59E-3	0.007	0.1	PASS
19	115.90E-3	0.050	0.1	PASS
20	27.65E-3	0.012	0.1	PASS
21	41.02E-3	0.018	0.1	PASS
22	25.81E-3	0.011	0.1	PASS
23	41.04E-3	0.018	0.1	PASS
24	23.53E-3	0.010	0.1	PASS
25	61.36E-3	0.027	0.1	PASS
26	47.32E-3	0.021	0.1	PASS
27	77.84E-3	0.034	0.1	PASS
28	36.35E-3	0.016	0.1	PASS
29	79.30E-3	0.034	0.1	PASS
30	21.44E-3	0.009	0.1	PASS
31	76.35E-3	0.033	0.1	PASS
32	24.79E-3	0.011	0.1	PASS
33	83.57E-3	0.036	0.1	PASS
34	26.01E-3	0.011	0.1	PASS
35	101.77E-3	0.044	0.1	PASS
36	24.28E-3	0.011	0.1	PASS
37	86.85E-3	0.038	0.1	PASS
38	24.28E-3	0.011	0.1	PASS
39	50.14E-3	0.022	0.1	PASS
40	21.76E-3	0.009	0.1	PASS

Partial odd harmonic current: 0.045 Limit: 0.251



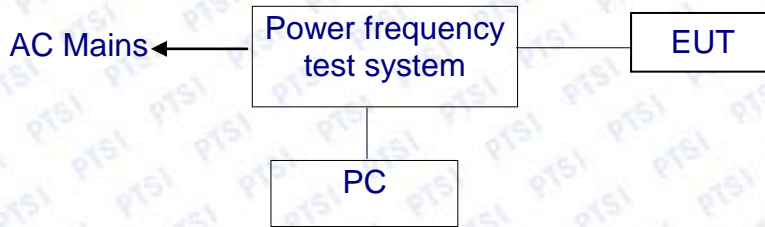


Power and THD results

True power P	908W	Apparent power S:	944VA
Reactiv power Q	348.3.var	Power factor:	0.963
THD (U)	0.003	THD (I):	0.239
Crest Factor (U)	1.414	Crest Factor (I):	1.697

6. VOLTAGE FLUCTUATIONS & FLICKER MEASUREMENT

6.1 Block Diagram of Test Setup



(EUT: UVGI AIR STERILIZER)

6.2 Measuring Standard

EN 61000-3-3:2013

6.3 Operating Condition of EUT

6.3.1 Setup the EUT as shown Section 6.1.

6.3.2 Turn on the power of all equipments.

6.3.3 Let EUT work in test mode (ON) and measure it.

6.4 Test Results

PASS.

Please refer to the following pages.

Test Report

Report Title	: Flicker
Company Name	: Shenzhen PTSI Testing Co., Ltd.
Date of Test	: 16:30December 08, 2017
Tester	: Alan
Standard Used	: EN/IEC 61000-3-3 Flicker
Short Time (Pst)	: 10 min
Observation Time	: 10 min (1 Flicker measurement)
Flicker Meter	: 230V / 50Hz
Flicker Impedance	: Zref (IEC 60725)
Customer	: Soma Medical (Sabah) Sdn Bhd (1248058-D)
E. U. T.	: UVGI AIR STERILIZER
M/N	: SM 20
Mode	: ON

Test Result	PASS
-------------	------

Maximum Flicker Results

	EUT Values	Limit	Result
Pst	0.052	1.00	PASS
Plt	0.053	0.65	PASS
dc [%]	0.212	3.30	PASS
dmax [%]	0.328	4.00	PASS
dt [s]	0.000	0.50	PASS

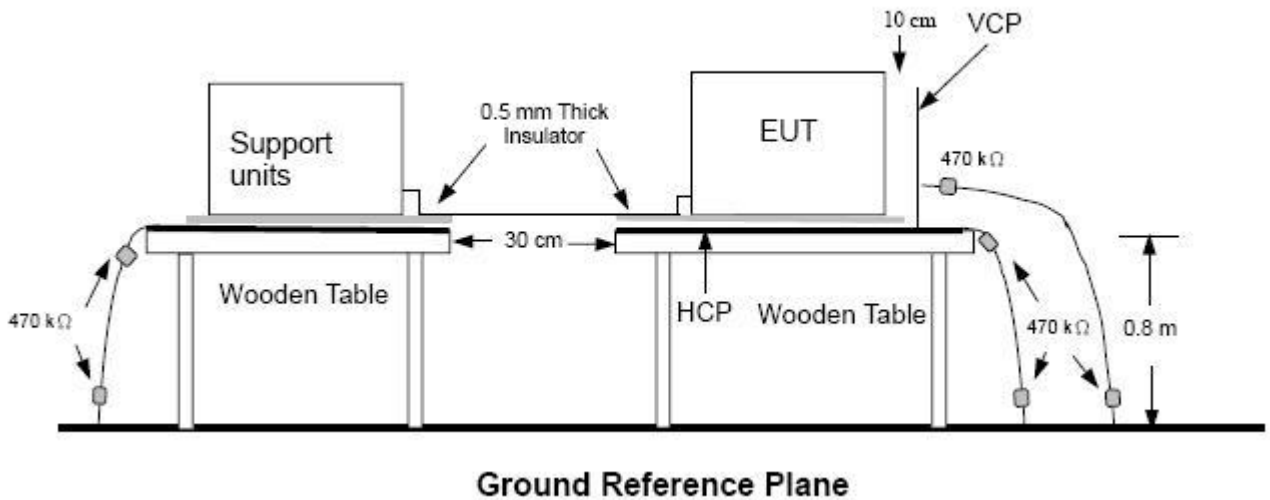
7. ELECTROSTATIC DISCHARGE TEST

7.1 Block Diagram of Test Setup

7.1.1 Block Diagram of connection between the EUT and simulators



7.1.2 Block Diagram of ESD Test Setup



(EUT: UVGI AIR STERILIZER)

7.2 Test Standard

EN 55014-2:2015

(EN 61000-4-2 (Severity Level: 2 / Contact Discharge: $\pm 4\text{KV}$
Severity Level: 3 / Air Discharge: $\pm 8\text{KV}$))

7.3 Severity Levels and Performance Criterion

7.3.1 Severity Level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	± 2	± 2
2.	± 4	± 4
3.	± 6	± 8
4.	± 8	± 15
X	Special	Special

7.3.2 Performance Criterion: B

7.4 EUT Configuration

The configuration of EUT is listed in Section 7.1.1

7.5 Operating Condition of EUT

7.5.1 Setup the EUT as shown in Section 7.1.

7.5.2 Turn on the power of all equipments.

7.5.3 Let the EUT work in test mode (ON) and measure it.

7.6 Test Procedure

7.6.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. Then the generator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharges are completed.

7.6.2 Contact Discharge:

All the procedure shall be same as Section 7.6.1, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.6.3 Indirect discharge for horizontal coupling plane:

At least 20 single discharges shall be 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.

7.6.4 Indirect discharge for vertical coupling plane:

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

7.7 Test Results

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

Shenzhen PTSI Testing Co., Ltd.

Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)	Test Date : December 08, 2017	
EUT : UVGI AIR STERILIZER	Temperature : 22°C	
M/N : SM 20	Humidity : 50%	
Power Supply : AC 230V/50Hz	Test Engineer : Jees	
Test Mode : ON	Criterion : B	
Air Discharge: ±2, 4, 6, 8KV		
Contact Discharge: ±2, 4KV # Positive 25 times and negative 25 times for each point		
Location	Mode A-Air Discharge C-Contact Discharge	Result
Aperture	10 points A	PASS
Switch	10 points A	PASS
Metal	10 points A	PASS
HCP	10 points A	PASS
VCP of Front	10 points A	PASS
VCP of Top	10 points A	PASS
VCP of Back	10 points A	PASS
VCP of Left	10 points A	PASS
VCP of Right	10 points A	PASS
Remark :	Test Equipment : ESD Tester (Schaffner, NSG432)	

Discharges should be conducted on Contact, Air, Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

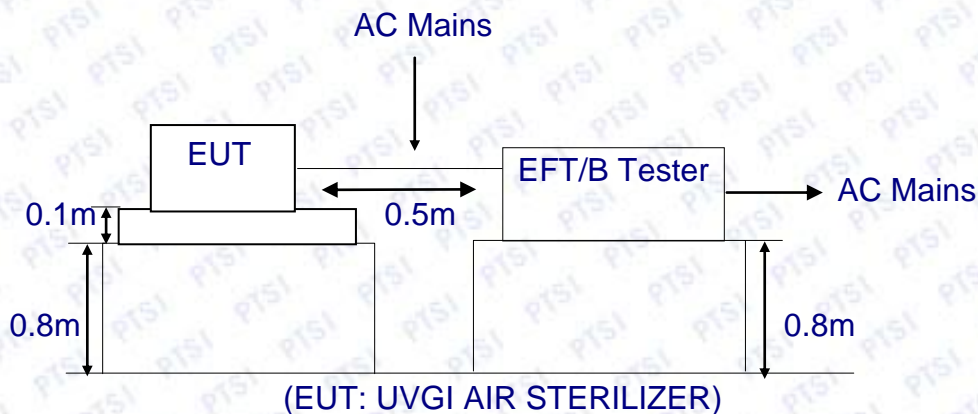
8. ELECTRICAL FAST TRANSIENT/BURST TEST

8.1 Block Diagram of Test Setup

8.1.1 Block Diagram of connection between the EUT and simulators



8.1.2 Block Diagram of EFT Test Setup



8.2 Test Standard

EN 55014-2:2015
(EN 61000-4-4, Severity Level, Level 2: 1KV)

8.3 Severity Levels and Performance Criterion

8.3.1 Severity Level

Open Circuit Output Test Voltage and Repetition Rate of The Impulses		
Level	On I/O (Input/Output) Signal data and control ports	
	Voltage peak KV	Repetition rate KHz
1.	0.25 KV	5 or 100
2.	0.5 KV	5 or 100
3.	1 KV	5 or 100
4.	2 KV	5 or 100
X	Special	Special

NOTE 1: Use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.

NOTE 2: With some products, there must be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.

“X” is an open level. The level has to be specified in the dedicated equipment specification.

8.3.2 Performance Criterion: B

8.4 EUT Configuration

The configuration of EUT is listed in Section 8.1.1.

8.5 Operating Condition of EUT

8.5.1 Setup the EUT as shown in Section 8.1.

8.5.2 Turn on the power of all equipments.

8.5.3 Let the EUT work in test mode (ON) and measure it.

8.6 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall 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 beneath the EUT, shall be more than 0.5m.

8.6.1 For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

8.6.2 For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

8.6.3 For DC output line ports:

No DC ports. It's unnecessary to test.

8.7 Test Results

PASS.

Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Shenzhen PTSI Testing Co., Ltd.

Standard	<input type="checkbox"/> IEC 61000-4-4 <input checked="" type="checkbox"/> EN 61000-4-4	Result : <input checked="" type="checkbox"/> PASS / <input type="checkbox"/> FAIL	
Applicant	Soma Medical (Sabah) Sdn Bhd (1248058-D)		
EUT	UVGI AIR STERILIZER		
M/N	SM 20		
Input Voltage	AC 230V/ 50Hz		
Criterion	B		
Ambient Condition	22°C, 50%RH		
Operation Mode	ON		
Line	<input checked="" type="checkbox"/> AC Mains	Line : <input type="checkbox"/> Signal <input type="checkbox"/> I/O Cable	
Coupling	<input checked="" type="checkbox"/> Direct	Coupling : <input type="checkbox"/> Capacitive	
Test Time : 120s			
Line	Test Voltage	Result (+)	Result (-)
L	1KV	PASS	PASS
N	1KV	PASS	PASS
PE	1KV	PASS	PASS
L+N	1KV	PASS	PASS
L+PE	1KV	PASS	PASS
N+PE	1KV	PASS	PASS
L+N+PE	1KV	PASS	PASS
Signal Line			
DC Line			
Note:			
Test Equipment:		Burst Tester Model : UCS500M6B	

9. SURGE IMMUNITY TEST

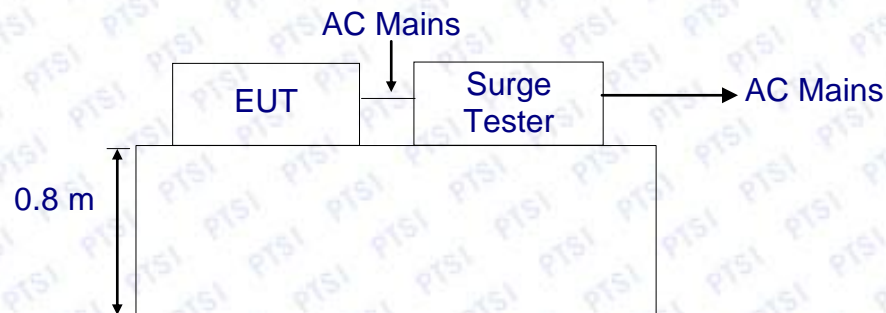
9.1 Block Diagram of Test Setup

9.1.1 Block Diagram of the EUT



(EUT: UVGI AIR STERILIZER)

9.1.2 Surge Test Setup



(EUT: UVGI AIR STERILIZER)

9.2 Test Standard

EN 55014-2:2015

(EN 61000-4-5, Severity Level: Line to Line: Level 2, 1.0KV

Line to Ground: Level 3, 2.0KV)

9.3 Severity Levels and Performance Criterion

9.3.1 Severity Level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

9.3.2 Performance Criterion: B

9.4 EUT Configuration

The configuration of EUT is listed in Section 9.1.1.

9.5 Operating Condition of EUT

9.5.1 Setup the EUT as shown in Section 9.1.

9.5.2 Turn on the power of all equipments.

9.5.3 Let the EUT work in test mode (ON) and measure it.

9.6 Test Procedure

1) Set up the EUT and test generator as shown on Section 9.1.2.

2) For line to line coupling mode, provide a 1.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

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

4) The test is done on different phase angles individually.

5) Record the EUT operating situation during the test and decide the EUT immunity criterion for each test of above.

9.7 Test Results

PASS.

Please refer to the following page.

Surge Immunity Test Results

Shenzhen PTSI Testing Co., Ltd.

Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)				Test Date : December 08, 2017	
EUT : UVGI AIR STERILIZER				Temperature : 20°C	
M/N : SM 20				Humidity : 50%	
Power Supply : AC 230V/50Hz				Test Engineer : Jeess	
Test Mode : ON				Criterion : B	
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Result
L-N	±	00	5	0.5	PASS
	±	900	5	0.5	PASS
	±	1800	5	0.5	PASS
	±	2700	5	0.5	PASS
L-N	±	0 ⁰	5	1.0	PASS
	±	90 ⁰	5	1.0	PASS
	±	180 ⁰	5	1.0	PASS
	±	270 ⁰	5	1.0	PASS
L-PE N-PE	±	0 ⁰	5	2.0	PASS
	±	90 ⁰	5	2.0	PASS
	±	180 ⁰	5	2.0	PASS
	±	270 ⁰	5	2.0	PASS

L-N L-PE N-PE	±	0°	5	2.0	PASS
	±	90°	5	2.0	PASS
	±	180°	5	2.0	PASS
	±	270°	5	2.0	PASS
Remark:			Test Equipment : Surge Tester P surge4.1		

10.5 Operating Condition of EUT

10.5.1 Setup the EUT as shown in Section 10.1.

10.5.2 Turn on the power of all equipments.

10.5.3 Let the EUT work in test mode (ON) and measure it.

10.6 Test Procedure

1) Set up the EUT, CDN and test generators as shown on Section 10.1.2.

2) Let the EUT work in test mode and measure it.

3) The EUT are placed on an insulating support 0.1m high above the 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).

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

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

6) The frequency range is swept from 150KHz to 230MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.

7) The rate of sweep shall not exceed $1.5 \cdot 10^{-3}$ 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.

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

10.7 Test Results

PASS.

Please refer to the following page.

Injected Currents Susceptibility Test Results

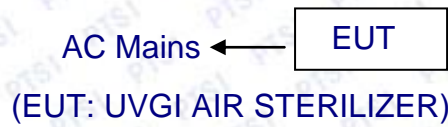
Shenzhen PTSI Testing Co., Ltd.

Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)	Test Date : December 08, 2017															
EUT : UVGI AIR STERILIZER	Temperature : 20°C															
M/N : SM 20	Humidity : 50%															
Power Supply : AC 230V/50Hz	Test Engineer : Jeess															
Test Mode : ON																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Frequency Range (MHz)</th> <th style="width: 25%;">Injected Position</th> <th style="width: 25%;">Strength</th> <th style="width: 25%;">Criterion</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.15 ~ 230</td> <td style="text-align: center;">AC Mains</td> <td style="text-align: center;">3V(rms)</td> <td style="text-align: center;">A</td> <td style="text-align: center;">PASS</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Frequency Range (MHz)	Injected Position	Strength	Criterion	Result	0.15 ~ 230	AC Mains	3V(rms)	A	PASS					
Frequency Range (MHz)	Injected Position	Strength	Criterion	Result												
0.15 ~ 230	AC Mains	3V(rms)	A	PASS												
Test Mode :																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Frequency Range (MHz)</th> <th style="width: 25%;">Injected Position</th> <th style="width: 25%;">Strength</th> <th style="width: 25%;">Criterion</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Frequency Range (MHz)	Injected Position	Strength	Criterion	Result										
Frequency Range (MHz)	Injected Position	Strength	Criterion	Result												
Remark : 1. Modulation Signal:1KHz 80% AM Measurement Equipment : Simulator: CWS 500C (SWITZERLAND EMTEST) CDN : <input type="checkbox"/> CDN-M2 (SWITZERLAND EMTEST) <input checked="" type="checkbox"/> CDN-M3 (SWITZERLAND EMTEST)																
Note:																

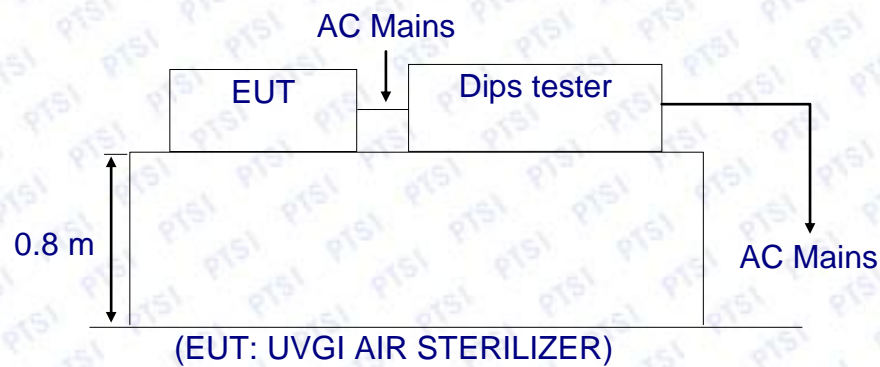
11. VOLTAGE DIPS AND INTERRUPTIONS TEST

11.1 Block Diagram of Test Setup

11.1.1 Block Diagram of the EUT



11.1.2 Dips Test Setup



11.2 Test Standard

EN 55014-2:2015 (EN 61000-4-11)

11.3 Severity Levels and Performance Criterion

11.3.1 Severity Level

Test Level $\%U_T$	Voltage Dip and Short Interruptions $\%U_T$	Duration (in period)
0	100	0.5 1
40	60	5 10
70	30	25 50 *

11.3.2 Performance Criterion: C

11.4 EUT Configuration

The configuration of EUT is listed in Section 11.1.1.

11.5 Operating Condition of EUT

11.5.1 Setup the EUT as shown in Section 11.1.

11.5.2 Turn on the power of all equipments.

11.5.3 Let the EUT work in test mode (ON) and measure it.

11.6 Test Procedure

1) Set up the EUT and test generator as shown on Section 11.1.2.

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

3) Record any degradation of performance.

11.7 Test Results

PASS.

Please refer to the following page.

Voltage Dips and Interruptions Test Results

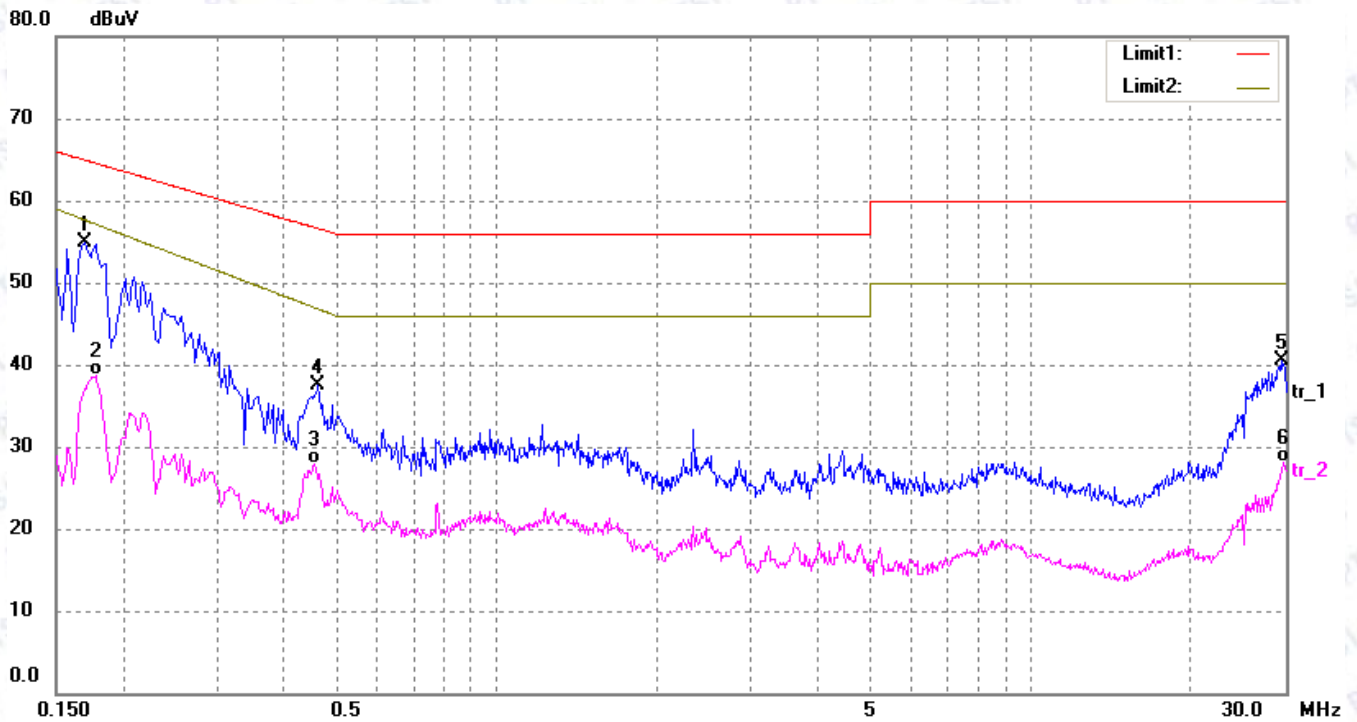
Shenzhen PTSI Testing Co., Ltd.

Applicant	: Soma Medical (Sabah) Sdn Bhd (1248058-D)	Test Date	: December 08, 2017		
EUT	: UVGI AIR STERILIZER	Temperature	: 20 °C		
M/N	: SM 20	Humidity	: 50%		
Power Supply	: AC 230V 50Hz	Test Engineer	: Jeess		
Test Model	: ON				
Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in period)		Criterion <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Result
		50 Hz	60 Hz		
0	100	0.5 P	0.5 P	C	PASS
40	60	10 P	12 P	C	PASS
70	30	25 P	30 P	C	PASS
Test Model :					
Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in period)		Criterion <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Result
Remark: U _T is the rated voltage for the equipment.				Test Equipment : Dips Tester PLINE1610	

12. APPENDIX

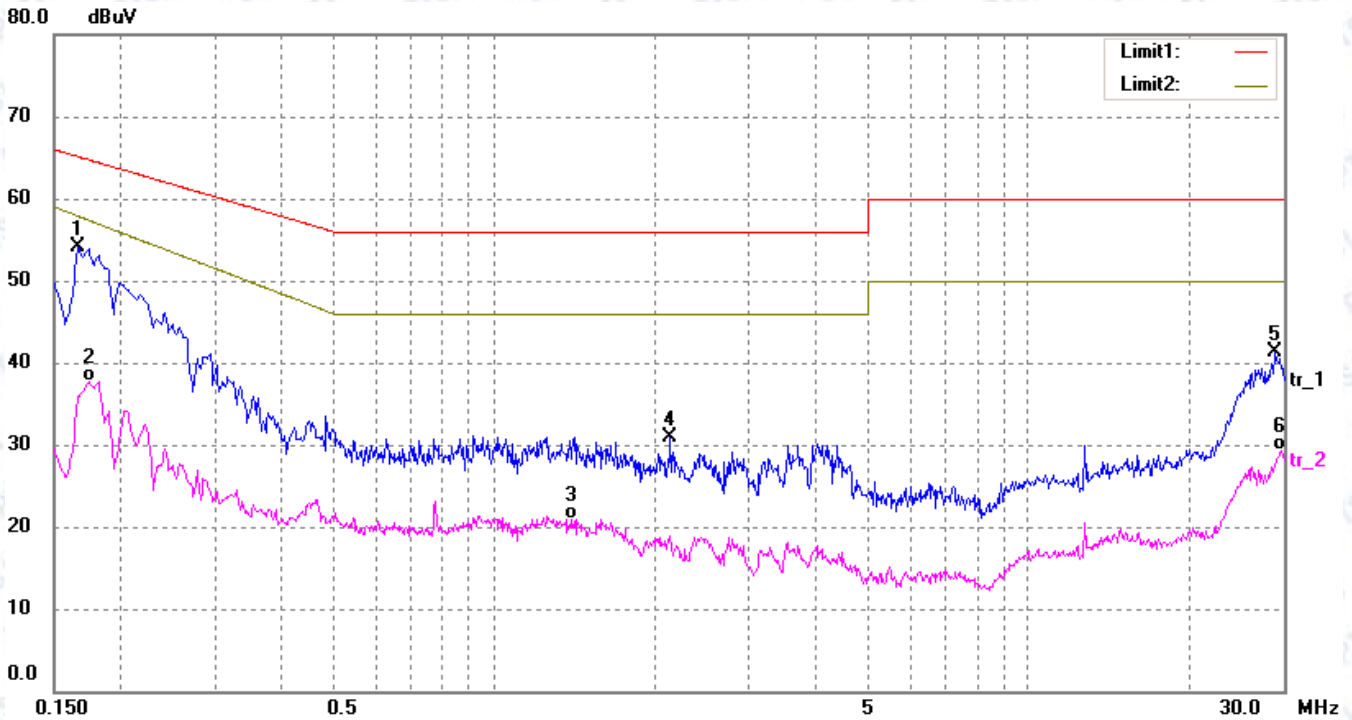
12.1 APPENDIX I

EUT : UVGI AIR STERILIZER Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)
 M/N : SM 20 Mode : ON
 Test Site : Shielded Room Phase Polarity : Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1700	45.40	9.50	54.90	64.96	-10.06	peak
2	0.1780	29.19	9.50	38.69	57.15	-18.46	AVG
3	0.4580	18.40	9.50	27.90	46.95	-19.05	AVG
4	0.4660	28.04	9.50	37.54	56.58	-19.04	peak
5	29.5220	27.51	13.00	40.51	60.00	-19.49	peak
6	29.7380	15.01	13.00	28.01	50.00	-21.99	AVG

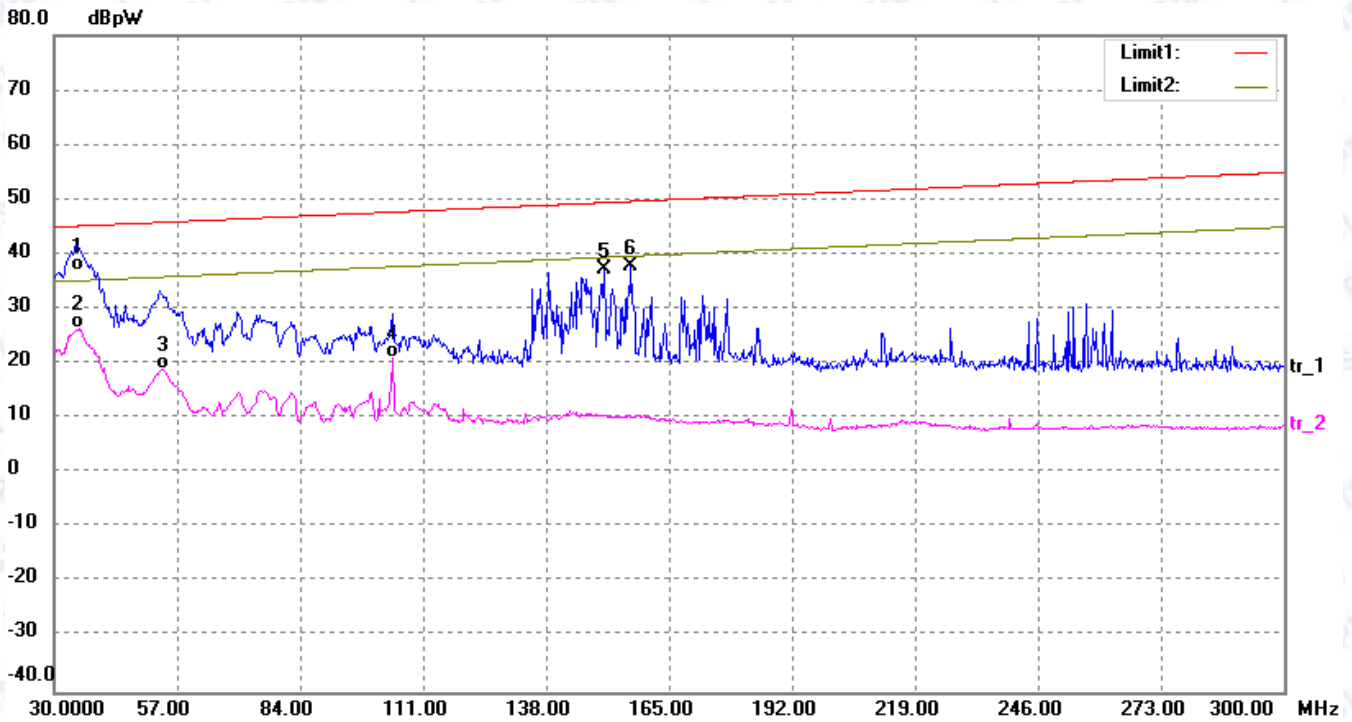
EUT : UVGI AIR STERILIZER Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)
M/N : SM 20 Mode : ON
Test Site : Shielded Room Phase Polarity : Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1660	44.62	9.50	54.12	65.16	-11.04	peak
2	0.1740	28.26	9.50	37.76	57.40	-19.64	AVG
3	1.3980	10.83	10.00	20.83	46.00	-25.17	AVG
4	2.1380	20.97	10.00	30.97	56.00	-25.03	peak
5	28.9660	28.32	13.00	41.32	60.00	-18.68	peak
6	29.7380	16.34	13.00	29.34	50.00	-20.66	AVG

12.2 APPENDIX II

EUT : UVGI AIR STERILIZER Applicant : Soma Medical (Sabah) Sdn Bhd (1248058-D)
M/N : SM 20 Mode : ON
Test Site : Shielded Room Remark : AC Mains



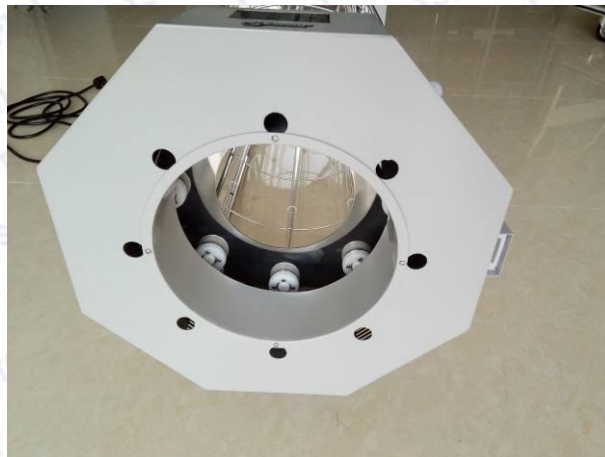
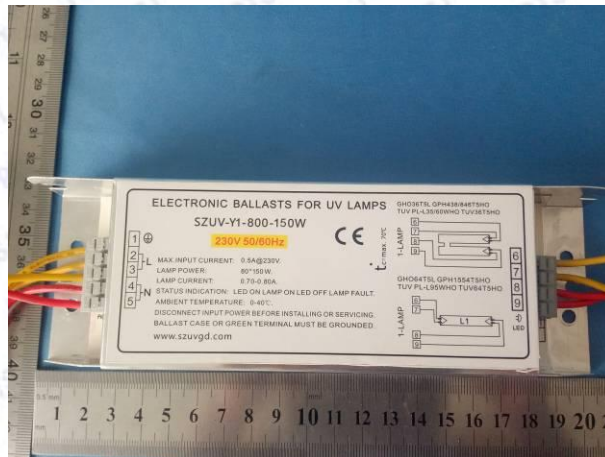
No.	Frequency (MHz)	Reading (dBpW)	Correct (dB/m)	Result (dBpW)	Limit (dBpW)	Margin (dB)	Detector
1*	35.3200	16.79	20.16	36.95	45.20	-8.25	QP
2	35.4800	6.28	20.14	26.42	35.20	-8.78	AVG
3	54.2400	0.93	18.02	18.95	35.90	-16.95	AVG
4	104.3200	4.73	16.38	21.11	37.75	-16.64	AVG
5	150.9200	19.63	17.58	37.21	49.48	-12.27	peak
6	156.8800	20.34	17.46	37.80	49.70	-11.90	peak

12.3 APPENDIX III Photos of EUT

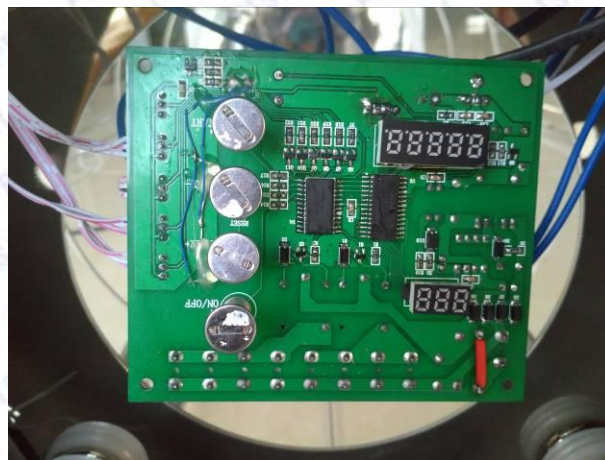
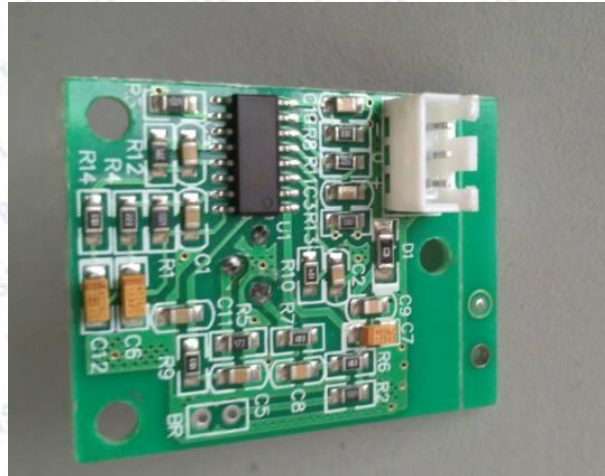
Photo documentation

Type of equipment, model: UVGI AIR STERILIZER, SM 20









*****End of Report*****