


EMC TEST REPORT

For

SUNON INTERNATIONAL GROUP LIMITED

Quartz watch movement

Trade Mark : 
SUNON MOVEMENT

Model No. : SL68,SL25,SL28,AD988,SP68,SP25,SP28,PE60,PE70,PE80,
PE90,PE10,PE25,PE26,PE27,PE28,PE11,PE21,PE22,PE32,
PE39,PE41,PE42,PE45,PE46,PE48,PE49.

Prepared for : SUNON INTERNATIONAL GROUP LIMITED
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Report No. : A001E140707007E

Date of Test : July 07-11, 2014

Date of Rep. : July 11, 2014

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TEST REPORT DECLARATION

Applicant : SUNON INTERNATIONAL GROUP LIMITED
Manufacturer : Wuhan Sunon Electronics Co.,Ltd
EUT Description : Quartz watch movement

(A) Model No. : SL68
(B) Serial No. : N/A
(C) Power Supply : DC 1.2-1.75V

Test Procedure Used:


EMI: EN 61000-6-3: 2007+A1:2011


EMS: EN 61000-6-1: 2007 (EN61000-4-2: 2009,
EN61000-4-3: 2010)


The device described above has been tested by **Shenzhen AOV Testing Technology Co., Ltd.** to determine the maximum emission levels emanating from the device, the severe levels that the device can endure and EUT'S performance criterion. The test results are contained in this test report. **Shenzhen AOV Testing Technology Co., Ltd.** is assumed of full responsibility for the accuracy and completeness of these tests. Also, this report shows that the EUT is technically compliant with the EN61000-6-3 and EN61000-6-1 requirements.

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

Date of Test: July 07-11, 2014

Prepared by: 
Zhang Jun, Kyle
Project Engineer

Reviewed by: 
Chen Chu Peng, Kait
Project Supervisor

Approved by: 
Yan Wei, Barry
Technical Director

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description : Quartz watch movement

Model Number : SL68,SL25,SL28,AD988,SP68,SP25,SP28,PE60,PE70,PE80,
PE90,PE10,PE25,PE26,PE27,PE28,PE11,PE21,PE22,PE32,
PE39,PE41,PE42,PE45,PE46,PE48,PE49.

Applicant : SUNON INTERNATIONAL GROUP LIMITED
Address : 2035 laws Commercial Plaza, 788 Cheung Sha Wan Road
Kooloon, HongKong.

Manufacturer : Wuhan Sunon Electronics Co.,Ltd
Yongang village Qianchuan Street, Huangpi district, Wuhan,
Hubei Province

Date of Test : July 07-11, 2014

1.2. Test Summary

Test Items		Status
Power line conducted emission test	EN 61000-6-3: 2007+A1:2011	N/A
Radiated emission test	EN 61000-6-3: 2007+A1:2011	Complied
Harmonic Current Emission test	EN 61000-3-2:2006+A2:2009	N/A
Voltage fluctuations & flicker test	EN 61000-3-3:2013	N/A
Electrostatic discharge Test	EN61000-4-2: 2009	Complied
RF Field strength susceptibility Test	EN61000-4-3: 2010	Complied
Electrical fast transient/Burst Test	EN61000-4-4: 2012	N/A
Surge Test	EN61000-4-5: 2006	N/A
Injected currents susceptibility test	EN61000-4-6: 2014	N/A
Magnetic field immunity test	EN61000-4-8: 2010	N/A
Voltage dips and interruptions test	EN61000-4-11: 2004	N/A

1.3. Test Facility

Test Firm : ACCURATE TECHNOLOGY CO.,LTD
 Address : F1,Bldg.A,Changyuan New Material Port Keyuan Rd.,
 Science&Industry Park, Nanshan ShenZhen,P.R.China
 Tel : 0755-26503290/0755-26507022
 Fax : 0755-26503396

1.4. Uncertainty

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

1.5. Description of Test System

PC	DELL	E6420
Monitor	DELL	OG335H
Keyboard	DELL	SK-8115

2. TEST INSTRUMENT USED

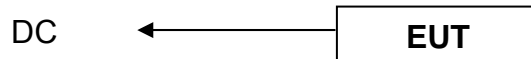
No.	Equipment	Manufacturer	Model No.	S/N	Cal. Date	Next Cal. Date
1	ESD TESTER	HAEFELY	PESD1610	H401552	2013.12.10	2014.12.10
2	MAGNETIC FIELD TESTER	HAEFELY	MAG100	150577	2013.12.10	2014.12.10
3	5kVA AC POWER SOURCE	CALIFORNIA INSTRUMENTS	5001ix-400	55692	2013.12.10	2014.12.10
4	HARMONICS/FLICKER TEST ANALYZER	CALIFORNIA INSTRUMENTS	PACS-1	72254	2013.12.10	2014.12.10
5	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200283933	2013.12.10	2014.12.10
6	CONICAL HOUSING	ATC	N/A	N/A	N/A	N/A
7	VOLTAGE PROBE	SCHWARZBECK	TK9416	N/A	2013.12.10	2014.12.10
8	RF CURRENT PROBE	ROHDE& SCHWARZ	EZ-17	100048	2013.12.10	2014.12.10
9	BILOG ANTENNA	SCHWARZBECK	VULB9163	194	2013.12.10	2014.12.10
10	SPECTRUM ANALYZER	ANRITSU	MS2651B	N/A	2013.12.10	2014.12.10
11	PRE-AMPLIFIER	AGILENT	8447D	294A10619	2013.12.10	2014.12.10
12	RF COAXIAL CABLE(844 CHAMBER)	SCHWARZBECK	N-5m	NO.1	2013.12.10	2014.12.10
13	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS004	2013.12.10	2014.12.10
14	1# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
15	2# SHIELDING ROOM	CHANGZHOU ZHONGYU	843	N/A	N/A	N/A
16	3m Semi-ANECHOIC CHAMBER	CHANGZHOU ZHONGYU	844	N/A	N/A	N/A
17	ANTENNA/TURNTABLE CONTROLLER	INNCO	CO2000	CO2000/077/7301203/L	N/A	N/A
18	101 LCR METER	YANGZHI	YD2810B	20101170	2013.12.10	2014.12.10
19	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.6	2013.12.10	2014.12.10
20	RF COAXIAL CABLE(844 CHAMBER)	NTGS8017	N-1m	NO.7	2013.12.10	2014.12.10
21	AUDIO GENERATOR	GW	GAG-809	EG835424	N/A	N/A
22	THERMO-HYGROMETER	OREGON SCIENTIFIC	JB913R	GZ-WS002	2013.12.10	2014.12.10

No.	Equipment	Manufacturer	Model No.	S/N	Cal. Date	Next Cal. Date
23	EMCPRO SYSTEM (IMMUNITY TESTER)	THERMO	PRO-BASE	0403271	2013.12.10	2014.12.10
24	CAPACITIVE CLAMP (EFT)	THERMO	PRO-CCL	0403272	2013.12.10	2014.12.10
25	COUPLER DECOUPLER FOR TELECOM LINES	THERMO	CM-TEL-CD	0403273	2013.12.10	2014.12.10
26	L.I.S.N.	ROHDE& SCHWARZ	ESH3-Z5	100305	2013.12.10	2014.12.10
27	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	100396/003	2013.12.10	2014.12.10
28	SIGNAL GENERATOR	ROHDE& SCHWARZ	SML01	101161	2013.12.10	2014.12.10
29	EMI TEST RECEIVER	ROHDE& SCHWARZ	ESPI-3	101526/003	2013.12.10	2014.12.10
30	SPECTRUM ANALYZER	AGILENT	E7405A	MY45115511	2013.12.10	2014.12.10
31	L.I.S.N.	SCHWARZBECK	NSLK8126	8126431	2013.12.10	2014.12.10
32	PULSE LIMITER (FOR ESPI3)	ROHDE& SCHWARZ	ESH3-Z2	100815	2013.12.10	2014.12.10
33	PRE-AMPLIFIER	ROHDE& SCHWARZ	CBLU1183540-0 1	3791	2013.12.10	2014.12.10
34	50Ω COAXIAL SWITCH	ANRITSU	MP59B	6200506474	2013.12.10	2014.12.10
35	BILOG ANTENNA	SCHWARZBECK	VULB9163	9163-323	2013.12.10	2014.12.10
36	HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-655	2013.12.10	2014.12.10
37	HORN ANTENNA	SCHWARZBECK	BBHA9170	9170-359	N/A	N/A
38	LOOP ANTENNA	SCHWARZBECK	FMZB1516	1516131	2013.12.10	2014.12.10
39	ULTRA COMPACT SIMULATOR	EM TEST	UCS 500 N5	V0928104968	2013.12.10	2014.12.10
40	CAPACITIVE CLAMP	EM TEST	HFK	0509-34	2013.12.10	2014.12.10
41	Transformer	EM TEST	V4780S2	0109-44	N/A	N/A
42	Conducted Immunity Test System	FRANKONIA	CIT-10	126B1121	2013.12.10	2014.12.10
43	CDN	FRANKONIA	CDN-M2/3	A3027020	2013.12.10	2014.12.10
44	EM Injection Clamp	FCC	F-203I-23mm	091824	2013.12.10	2014.12.10
45	LISN	AFJ	LS16C	16010946249	2013.12.10	2014.12.10
46	CLICK METER	AFJ	CL55C	55040947164	2013.12.10	2014.12.10

3. RADIATED EMISSION TEST

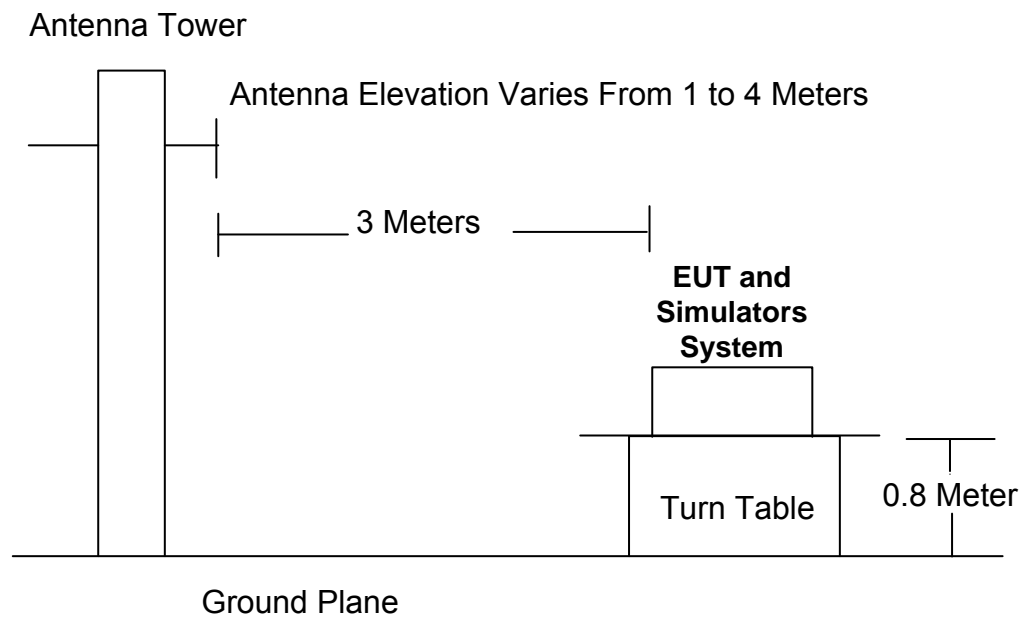
3.1. Block Diagram of Test Setup

3.1.1. Block Diagram of EUT Test Setup



(EUT: Quartz watch movement)

3.1.2. Anechoic Chamber Setup Diagram



(EUT: Quartz watch movement)

3.2. Test Standard

EN 61000-6-3: 2007+A1:2011

3.3. Radiated Emission Limit

Frequency MHz	Distance (Meter/s)	Field Strengths Limits dB(μ V)/m
30 ~ 230	3	40.0
230 ~ 1000	3	47.0

- Remark:
- (1) Emission level (dB (μ V)/m) = 20 log Emission level (μ V/m)
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

3.4. EUT Configuration on Test

The EN 61000-6-3 regulations test method must be used to find the maximum emission during radiated emission test.

3.4.1. Quartz watch movement (EUT)

- (A) Model No. : SL68
 (B) Serial No. : N/A

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT and simulators as shown in Section 3.1.
- 3.5.2. Turn on the power of all equipments.
- 3.5.3. Let the EUT work in test mode and test it.

3.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN61000-6-3 on radiated emission test.

The bandwidth setting on the field strength meter (R & S Test Receiver ESCI) is set at 120 KHz.

The frequency range from 30 MHz to 1000 MHz is investigated. The test data are listed in the Section 3.7 and the scanning waveform are attached within APPENDIX I.

3.7. Radiated Emission Test Result

PASS.

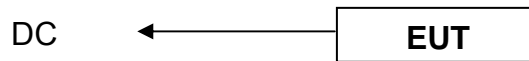
The frequency spectrum from 30 MHz to 1000 MHz is investigated.

Detailed information, please see the APPENDIX (I) file.

4. ELECTROSTATIC DISCHARGE TEST

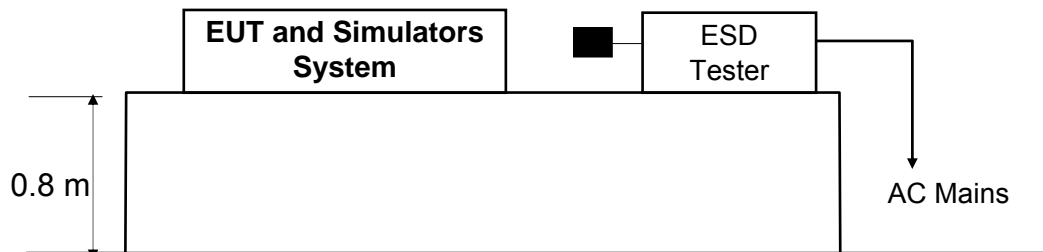
4.1. Block Diagram of Test Setup

4.1.1. Block Diagram of EUT Test Setup



(EUT: Quartz watch movement)

4.1.2.ESD Test Setup



Remark: ■ is Discharge Electrode

(EUT: Quartz watch movement)

4.2. Test Standard

EN 61000-6-1:2007 (EN61000-4-2: 2009)

4.3. Severity Levels and Performance Criterion

Severity Level 3 for Air Discharge at 8KV

Severity Level 2 for Contact Discharge at 4KV

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

Performance criterion: **B**

4.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.

4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown in Section 4.1.

4.5.2. Turning on the power of all equipments .

4.5.3. Let the EUT work in test mode and test it.

4.6. Test Procedure

4.6.1. 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. The generator is then 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 discharge completed.

4.6.2. Contact Discharge:

All the procedure shall be same as Section 4.6.1 except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

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 position is vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

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 X 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.

4.7. Test Results

PASS.

Detailed information, Please refer to the following page.

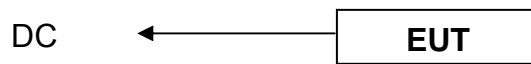
Electrostatic Discharge Test Results

EUT : Quartz watch movement	Temperature : 23°C	
M/N : SL68	Humidity : 56%	
Power Supply : DC 3V	Test Mode : On	
Air Discharge: ±8KV For each point positive 10 times and negative 10 times discharge. Contact Discharge: ±4KV		
Location	Kind A-Air Discharge C-Contact Discharge	Result
Slot	A	PASS
HCP	C	PASS
VCP	C	PASS
Remark: Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).	Test Equipment: See Clause 2.	

5. RF FIELD STRENGTH SUSCEPTIBILITY TEST

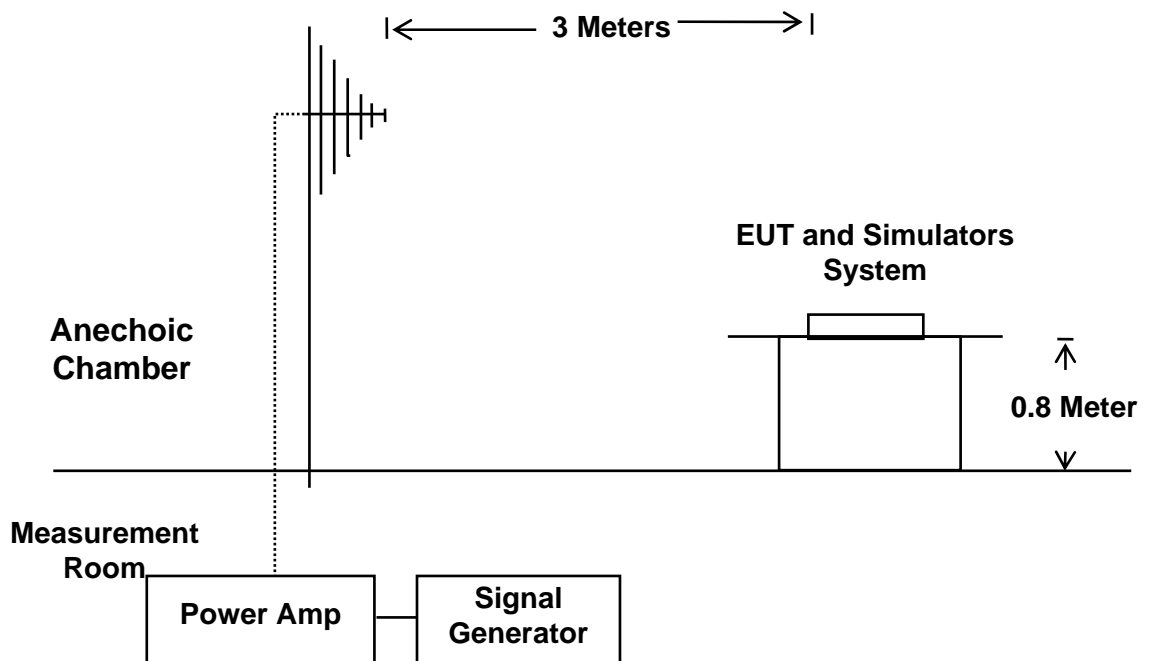
5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT Test Setup



(EUT: Quartz watch movement)

5.1.2.R/S Test Setup



(EUT: Quartz watch movement)

5.2. Test Standard

EN 61000-6-1:2007 (EN61000-4-3: 2010)

5.3. Severity Levels and Performance Criterion

Severity Level 2 at 3V / m, Severity Level:

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance criterion: **A**

5.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.

5.5. Operating Condition of EUT

- 5.5.1. Setup the EUT as shown in Section 5.1.
- 5.5.2. Turn on the power of all equipments.
- 5.5.3. Let the EUT work in test mode and test it.

5.6. Test Procedure

5.6.1. The EUT and its simulators are placed on a table that is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna that is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor the EUT.

5.6.2. All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	1 Sec.

5.7. Test Results

PASS.

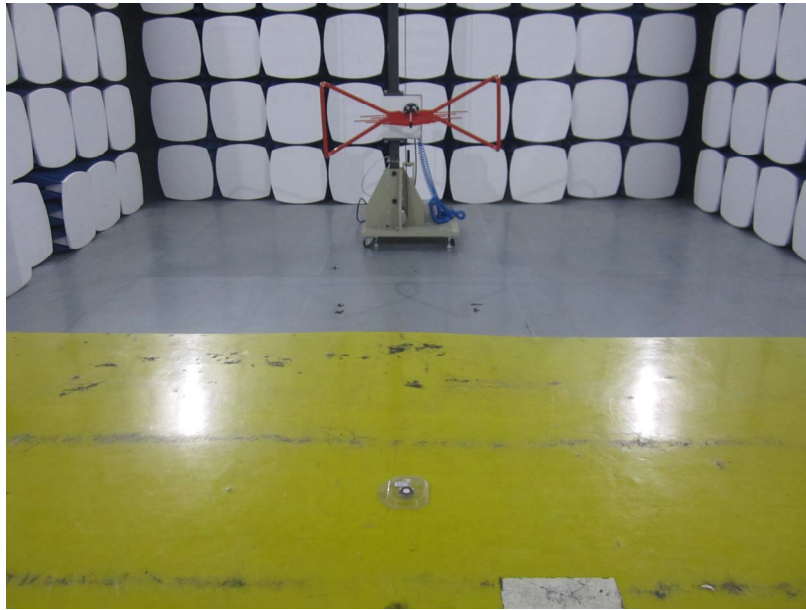
Detailed information, Please refer to the following page.

RF Field Strength Susceptibility Test Results

EUT	: Quartz watch movement	Temperature	: 23°C
M/N	: SL68	Humidity	: 56%
Power Supply	: DC 3V	Test Mode	: On
Modulation: <input checked="" type="checkbox"/> AM <input type="checkbox"/> Pulse <input type="checkbox"/> None 1 KHz 80%			
Frequency Range: 80MHz to 1000 MHz			
Steps	#	/	%
	Horizontal		Vertical
Front	Pass		Pass
Right	Pass		Pass
Rear	Pass		Pass
Left	Pass		Pass
<p>Test Equipment: See Clause 2.</p>			
<p>Note:</p>			

6. TEST SETUP PHOTOGRAPH

6.1. Photo of Radiated Emission Test

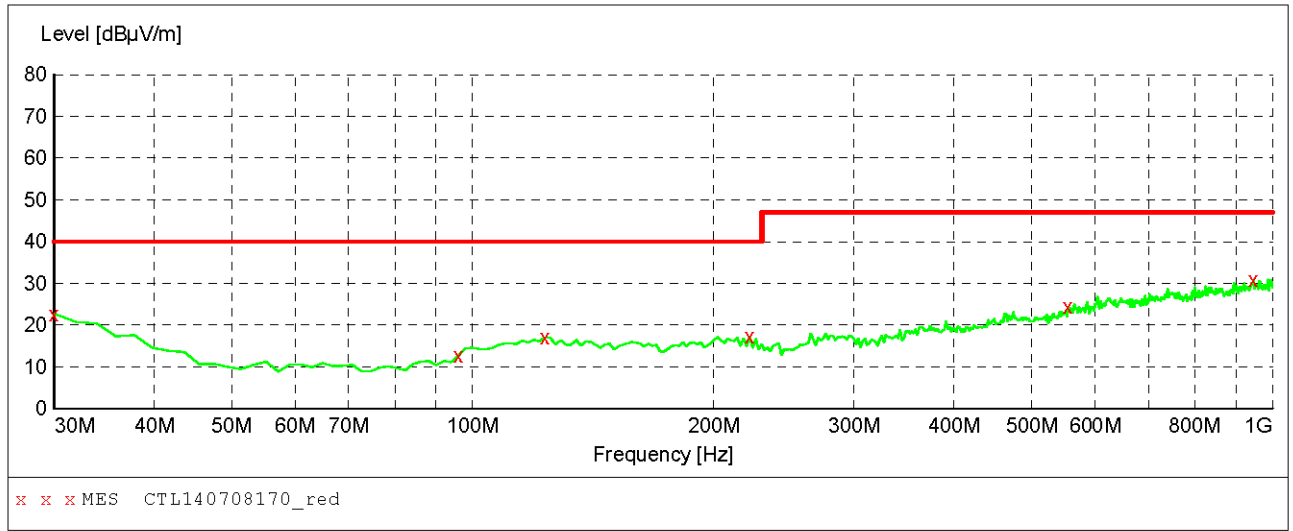


APPENDIX I

Radiated Emission Test Data

Radiated Emission

Engineer : Andy	
EUT : Quartz watch movement	Time : 2014/07/08
Limit : EN 61000-6-3	Comment : 26°C/56%
MN: SL68	Note : Hor



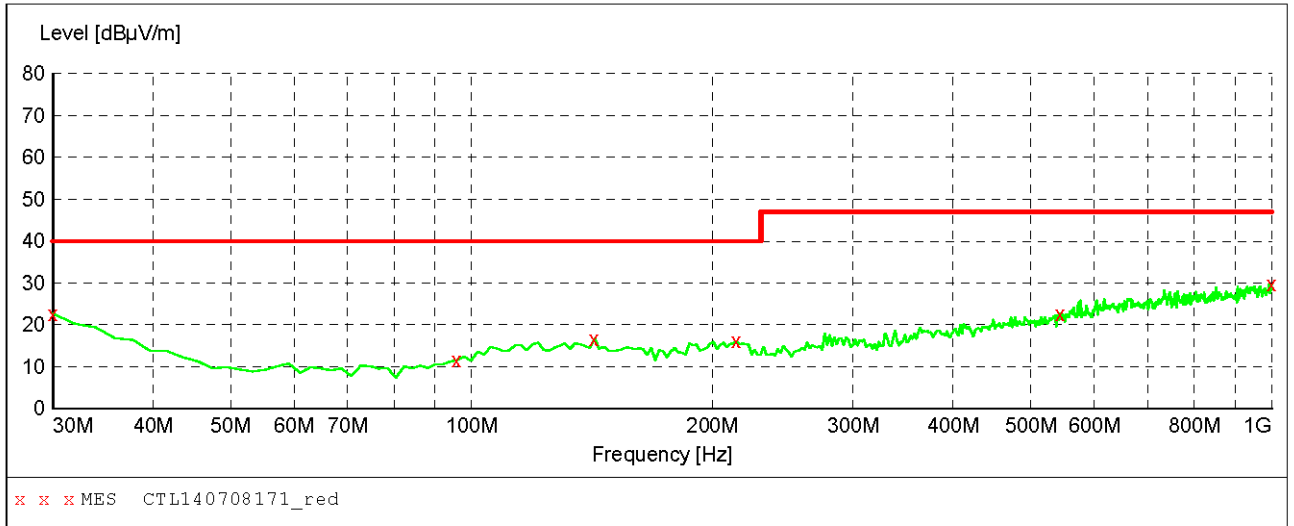
MEASUREMENT RESULT: "CTL140708170_red"

7/8/2014 2:59PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.70	21.1	40.0	17.3	---	0.0	0.00	HORIZONTAL
95.960000	12.60	10.6	40.0	27.4	---	0.0	0.00	HORIZONTAL
123.120000	17.10	15.1	40.0	22.9	---	0.0	0.00	HORIZONTAL
222.060000	17.30	14.2	40.0	22.7	---	0.0	0.00	HORIZONTAL
555.740000	24.40	21.1	47.0	22.6	---	0.0	0.00	HORIZONTAL
947.620000	30.90	26.6	47.0	16.1	---	0.0	0.00	HORIZONTAL

Radiated Emission

Engineer : Andy	
EUT : Quartz watch movement	Time : 2014/07/08
Limit : EN 61000-6-3	Comment : 26°C/56%
MN: SL68	Note : Ver



MEASUREMENT RESULT: "CTL140708171_red"

7/8/2014 3:00PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	22.60	21.1	40.0	17.4	---	0.0	0.00	VERTICAL
95.960000	11.60	10.6	40.0	28.4	---	0.0	0.00	VERTICAL
142.520000	16.70	14.5	40.0	23.3	---	0.0	0.00	VERTICAL
214.300000	16.10	14.3	40.0	23.9	---	0.0	0.00	VERTICAL
544.100000	22.70	20.9	47.0	24.3	---	0.0	0.00	VERTICAL
1000.000000	29.70	27.4	47.0	17.3	---	0.0	0.00	VERTICAL

APPENDIX II

Photographs of the EUT

FIGURE 1
Appearance of EUT (M/N: SL68)

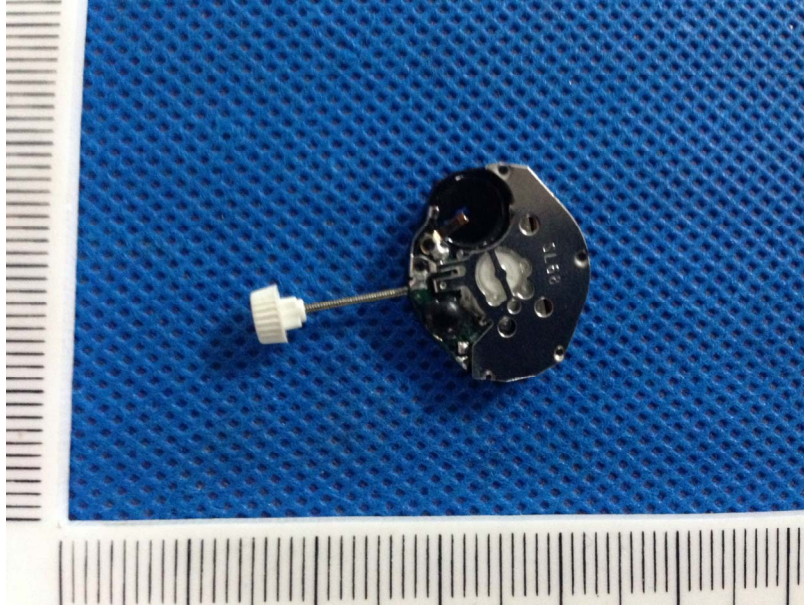


FIGURE 2
Appearance of EUT (M/N: SL68)

