



**CTS (NINGBO) TESTING SERVICE TECHNOLOGY  
INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# **EMC TEST REPORT**

**TEST REPORT NUMBER : CNB3170503-00363-E**



**CTS (Ningbo) Testing Service Technology Co., Ltd.**

Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd., Hi-Tech Zone, Ningbo, Zhejiang, China

<b>TEST REPORT</b> <b>EN 55014-1:2006+A2:2011</b> Electromagnetic compatibility-Requirements for household appliances, electric tools and similar apparatus-Part 1:Emission <b>EN 55014-2:2015</b> Electromagnetic compatibility Requirements for household appliances, Part 2:Immunity-Product family	
<b>Report Reference No.</b> .....	CNB3170503-00363-E
Date of issue .....	10 May 2017
<b>Testing Laboratory Name</b> .....	<b>CTS (Ningbo) Testing Service Technology Co., Ltd.</b>
Address .....	GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China..
Testing location/ procedure.....	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
<b>Applicant's name</b> .....	NINGBO SEAGO ELECTRIC CO.,LTD.
Address .....	NO.239,JIANGHU RD., C ZONE, HONGTANG INDUSTRIAL PARK,JIANGBEI DISTRICT,NINGBO,CHINA
<b>Test specification:</b>	
Standard.....	<b>EN 55014-1:2006+A2:2011,</b> <b>EN 55014-2:2015</b>
<b>Test Report Form No.</b> .....	CTSEMC-1.0
TRF Originator .....	CTS (Ningbo) Testing Service Technology Co., Ltd.
Master TRF .....	Dated 2009-01
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<b>Test item description</b> .....	SONIC TOOTHBRUSH
Trade Mark.....	/
Manufacturer .....	NINGBO SEAGO ELECTRIC CO.,LTD
Model/Type reference .....	SG-513
Ratings .....	Battery 1.5V, 0.18W(A)
Result .....	<b>PASSED</b>

Compiled by:



Kate zhang /File administrators

Supervised by:



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Approved by:



Vincent yao / Manager

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## EMC -- TEST REPORT

**Test Report No. : CNB3170503-00363-E**
10 May 2017  
Date of issue

Type / Model.....	SG-513
EUT.....	SONIC TOOTHBRUSH
<b>Applicant</b> .....	NINGBO SEAGO ELECTRIC CO.,LTD.
Address.....	NO.239,JIANGHU RD., C ZONE, HONGTANG INDUSTRIAL PARK,JIANGBEI DISTRICT,NINGBO,CHINA
Telephone.....	+86-0574-87357953
Fax.....	/
Contact.....	Jack Guo
<b>Manufacturer</b> .....	NINGBO SEAGO ELECTRIC CO.,LTD.
Address.....	NO.239,JIANGHU RD., C ZONE, HONGTANG INDUSTRIAL PARK,JIANGBEI DISTRICT,NINGBO,CHINA
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Contact.....	Jack Guo
<b>Factory</b> .....	NINGBO SEAGO ELECTRIC CO.,LTD.
Address.....	NO.239,JIANGHU RD., C ZONE, HONGTANG INDUSTRIAL PARK,JIANGBEI DISTRICT,NINGBO,CHINA
Telephone.....	+86-0574-87357953
Fax.....	/
Contact.....	Jack Guo

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## 1 TEST STANDARDS

The tests were performed according to following standards:

[EN 55014-1:2006+A2:2011](#) Electromagnetic compatibility-Requirements for household appliances, electric tools and similar apparatus-Part 1:Emission

[EN 55014-2:2015](#) Electromagnetic compatibility Requirements for household appliances, Part 2:Immunity Product family.

## 2 SUMMARY

### 2.1 GENERAL REMARKS

Date of receipt of test sample	05 May 2017
Testing commenced on	05~09 May 2017
Testing concluded on	10 May 2017

### 2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

- fulfilled.

- **not** fulfilled.

The equipment under test

- fulfils the EMC requirements cited on page 1.

- **does not** fulfil the EMC requirements cited on page 1.



### 3 EQUIPMENT UNDER TEST

#### 3.1 Power supply system utilised

Power supply voltage     Battery 1.5V  
    Other (Specified blank below)

#### 3.2 Short description of the Equipment under Test (EUT)

Number of tested samples:    1  
Serial number: Prototype

#### 3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Normal

**Operating Mode:**    Normal

Emissions tests.....: According to EN 55014-1, searching for the highest disturbance.

Immunity tests .....: According to EN 55014-2, searching for the highest susceptibility.

### 3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement :

Not Applicable

### 3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

### 3.6 Definition related to the performance level

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

**Criterion A:**

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

**Criterion B:**

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

**Criterion C:**

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

**Criterion D:**

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

### 4.2 Test facility

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

#### **CNAS-Lab Code: L3394**

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **IC-Registration No.: 8374A**

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

#### **FCC-Registration No.: 971995**

CTS (Ningbo) Testing Service Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 13, 2012.

### 4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

### 4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

### 4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

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#### 4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

#### 4.7 Test Description

##### 4.7.1 Description of Standards and Results

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance	EN 55014-1:2006+A2:2011	-----	N/A
Disturbance power test	EN 55014-1:2006+A2:2011	-----	N/A
Radiated disturbance	EN 55014-1:2006+A2:2011	-----	PASS
Harmonic current emissions	EN 61000-3-2:2014	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3:2013	-----	N/A
Clicks	EN 55014-1:2006+A2:2011		N/A
IMMUNITY (EN 55014-2:2015)			
Description of Test Item	Basic Standard	Performance Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2: 2008	B	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2006 +A1:2007+A2:2010	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2012	B	N/A
Surge (Input a.c. power ports)	IEC 61000-4-5:2014	B	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2013	A	N/A
Voltage dips, Interruptions	IEC 61000-4-11: 2004	C	N/A
Remark: The EUT is power supply by battery. N/A is an abbreviation for Not Applicable.			

## 5 TEST CONDITIONS AND RESULTS

### 5.1 Radiated disturbance (electric field)

For test instruments and accessories used see section 6 part 6.1.

#### 5.1.1 Description of the test location

Test location : Semi-Anechoic chamber

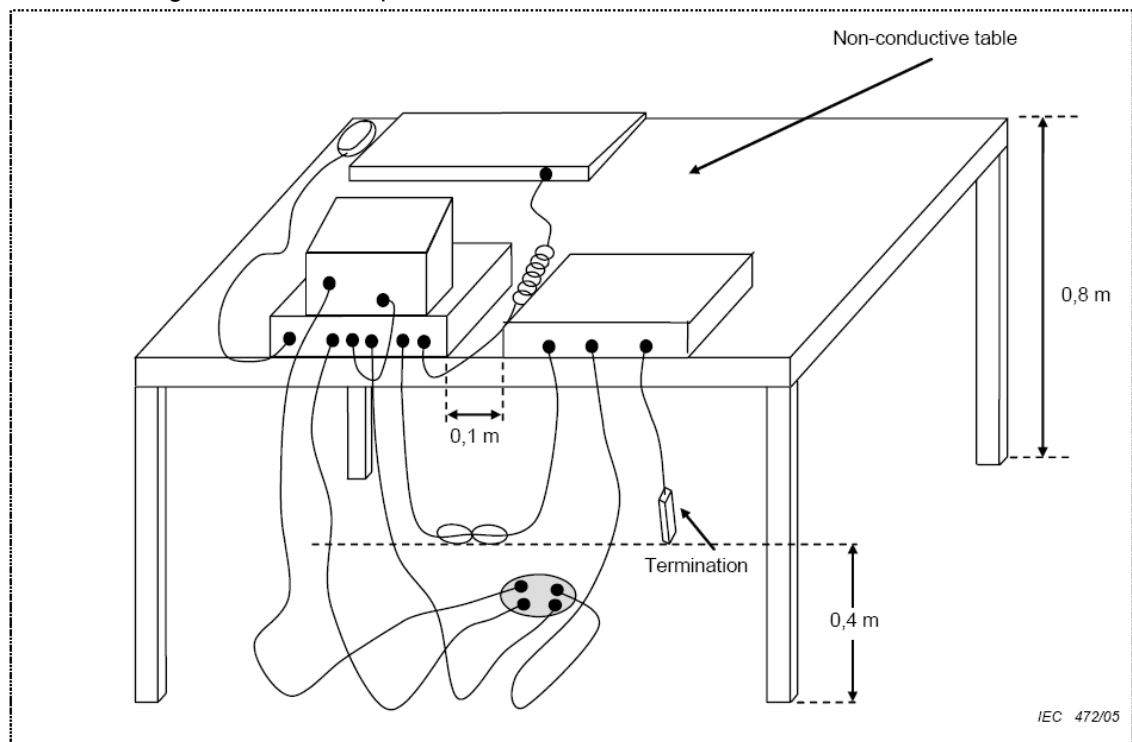
Test disturbance: 3 Meter

#### 5.1.2 Description of the test set-up

##### 5.1.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

##### 5.1.2.2 Block Diagram of Test Setup



#### 5.1.3 Limits of disturbance (Class B)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

**5.1.4 Test result**

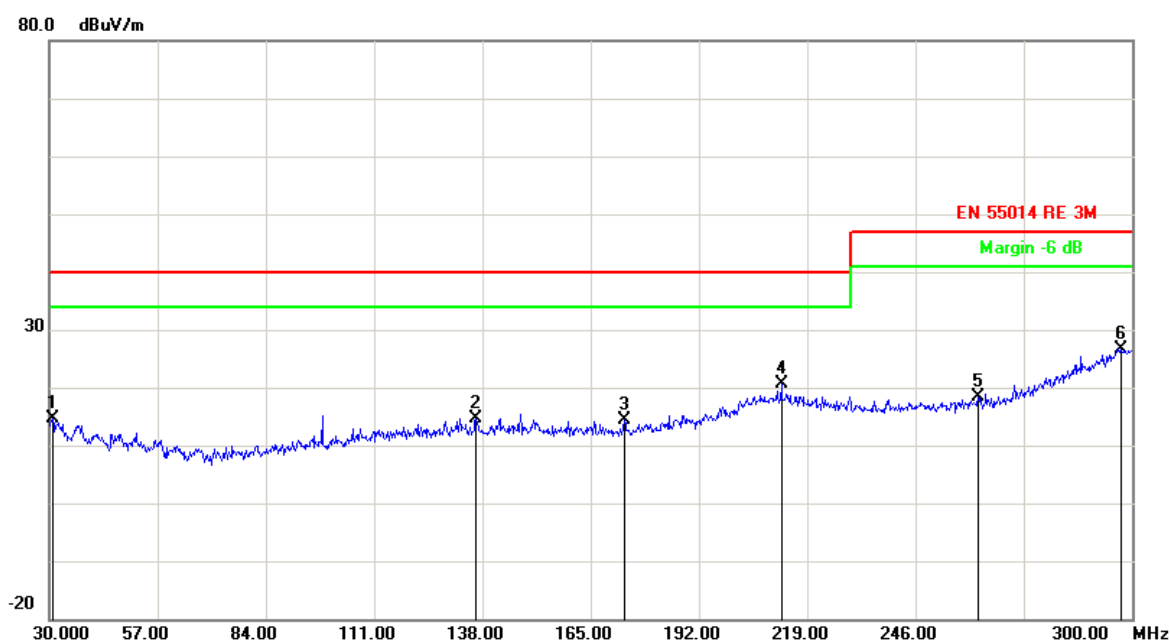
The requirements are	<b>Fulfilled</b>
Band width	120kHz
Frequency range	30 MHz - 1000 MHz
Min. limit margin	>13.43 dB at 30 MHz- 1000 MHz

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

5.1.5 Test protocol

Test point:	Horizontal	Result:	<input checked="" type="checkbox"/> - passed
Operation mode	Normal		<input type="checkbox"/> - not passed
Remarks:			

EUT	SONIC TOOTHBRUSH
Operating Condition	Battery 1.5V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	SG-513

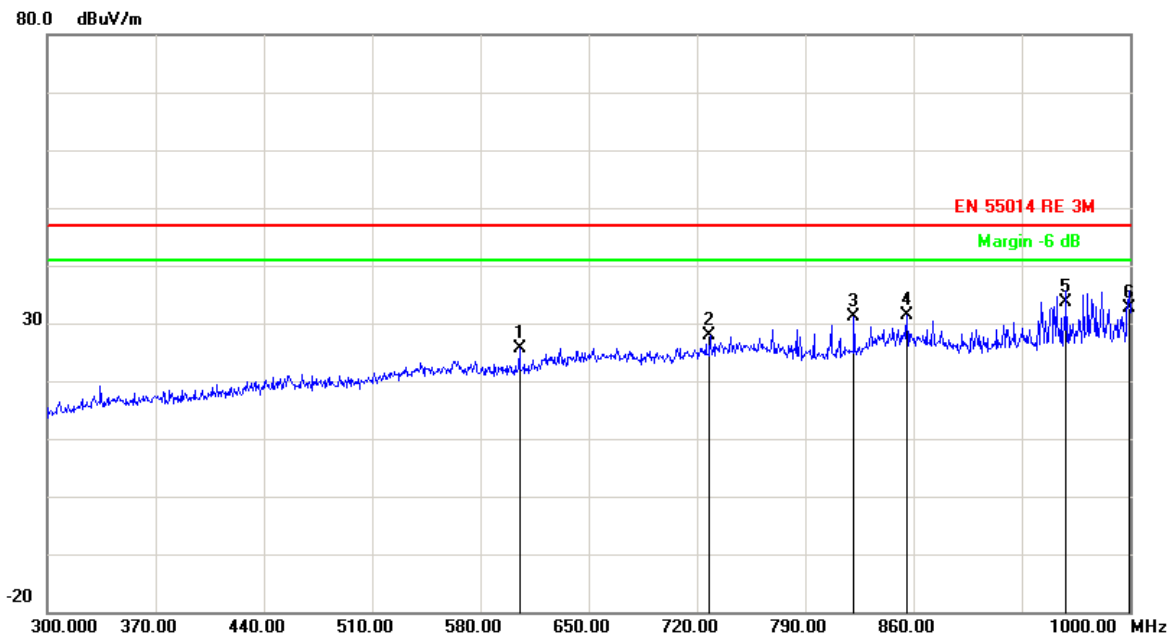


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	30.8099	-15.27	30.01	14.74	40.00	-25.26	QP
2	136.3799	-15.46	30.10	14.64	40.00	-25.36	QP
3	173.3700	-15.16	29.43	14.27	40.00	-25.73	QP
4	212.5200	-9.79	30.40	20.61	40.00	-19.39	QP
5	261.6600	-10.25	28.57	18.32	47.00	-28.68	QP
6	297.3000	-1.84	28.57	26.73	47.00	-20.27	QP

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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	605.2000	-5.20	30.87	25.67	47.00	-21.33	QP
2	728.3999	-2.16	29.99	27.83	47.00	-19.17	QP
3	821.5000	-1.74	32.77	31.03	47.00	-15.97	QP
4	855.7999	-0.29	31.69	31.40	47.00	-15.60	QP
5	958.7000	-0.05	33.62	33.57	47.00	-13.43	QP
6	999.2999	0.43	32.15	32.58	47.00	-14.42	QP

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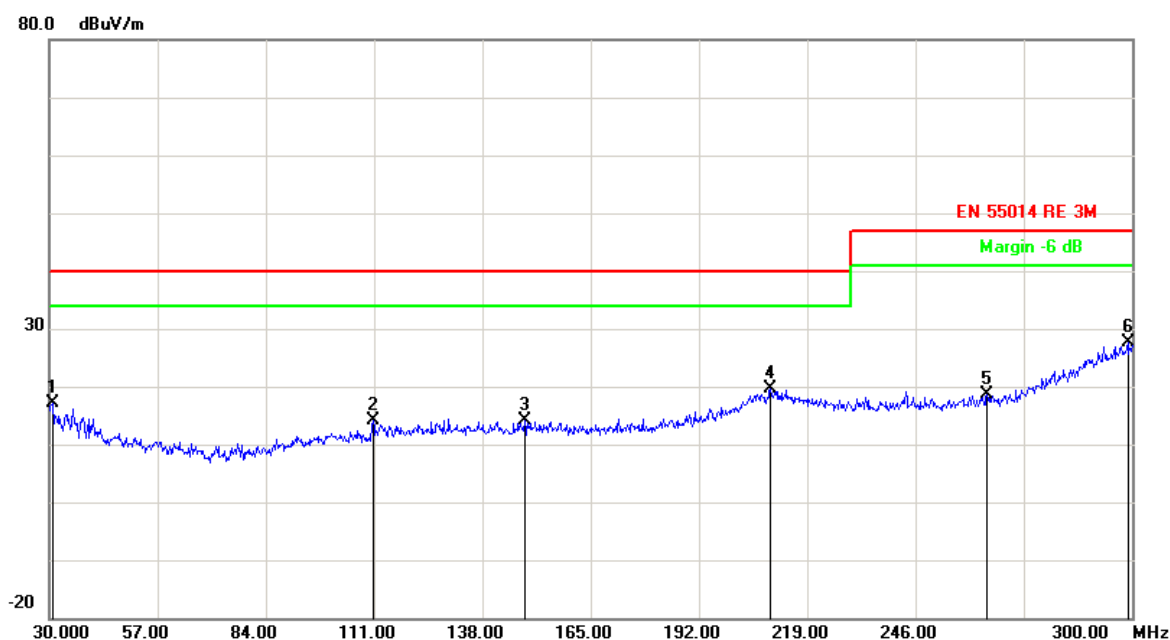
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Test point:	Vertical	Result:	<input checked="" type="checkbox"/> - passed
Operation mode	Normal		<input type="checkbox"/> - not passed
Remarks:			

EUT	SONIC TOOTHBRUSH
Operating Condition	Battery 1.5V
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Clark
MODEL NO.	SG-513

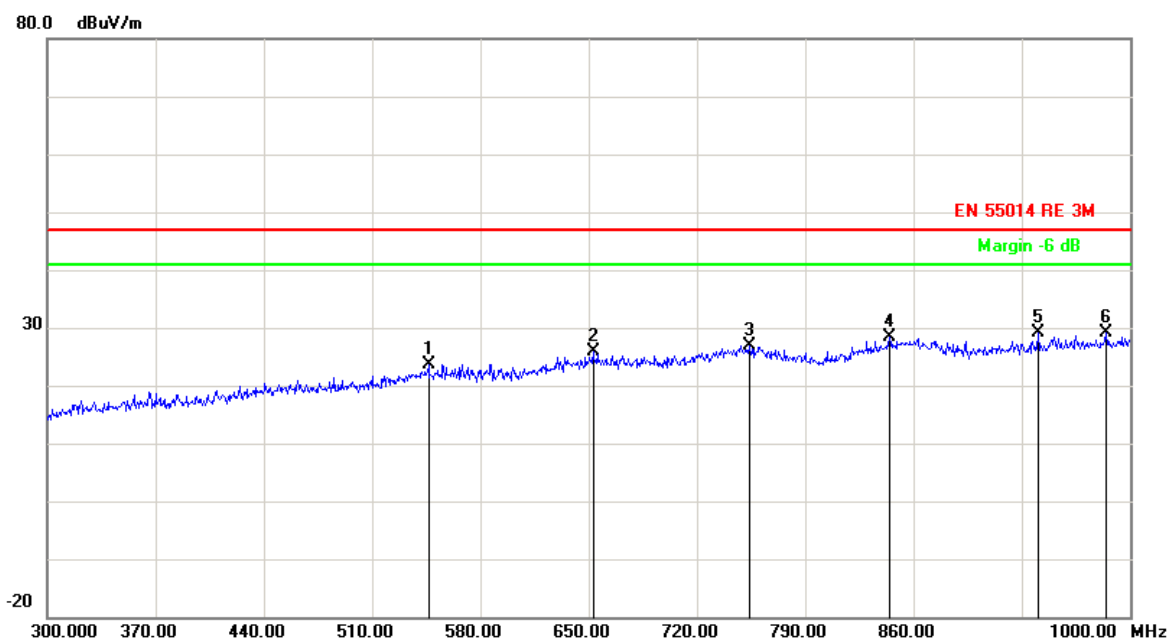


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	30.8099	-15.27	32.42	17.15	40.00	-22.85	QP
2	110.7300	-16.65	30.88	14.23	40.00	-25.77	QP
3	148.5300	-15.31	29.34	14.03	40.00	-25.97	QP
4	209.8199	-9.62	29.31	19.69	40.00	-20.31	QP
5	263.8199	-10.11	28.62	18.51	47.00	-28.49	QP
6	298.9200	-1.41	29.16	27.75	47.00	-19.25	QP

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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	546.4000	-5.66	29.34	23.68	47.00	-23.32	QP
2	652.8000	-3.16	29.15	25.99	47.00	-21.01	QP
3	754.3000	-1.47	28.35	26.88	47.00	-20.12	QP
4	844.6000	-0.44	28.73	28.29	47.00	-18.71	QP
5	940.5000	-0.40	29.45	29.05	47.00	-17.95	QP
6	984.6000	0.26	28.87	29.13	47.00	-17.87	QP

Note: Level=Reading+Factor. Margin= Limit-Level

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## 5.2 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.2.

### 5.2.1 Description of the test location

Test location :	Test location no. 2
Power supply:	Battery 1.5V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	05~09 May 2017
Operator :	Clark

### 5.2.2 Severity of levels electrostatic discharge

5.2.2.1 Severity level: Contact discharge at  $\pm 4\text{KV}$  air discharge at  $\pm 8\text{KV}$

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

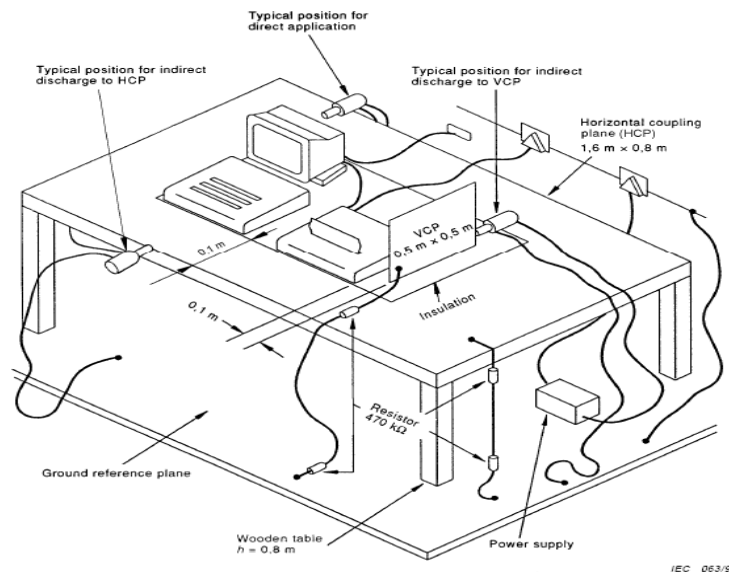
5.2.2.2 Performance criterion: B

### 5.2.3 Description of the test set-up

5.2.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.2.3.2 Block Diagram of Test Setup



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**5.2.4 Test specification:**

Contact discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	
Air discharge voltage:	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV	<input type="checkbox"/> 8 kV
Discharge impedance:	<input type="checkbox"/> 330 $\Omega$ / 150 pF		
Discharge factor:	<input type="checkbox"/> $\geq 1$ sec.		
Number of discharges:	<input type="checkbox"/> $\geq 10$		
Type of discharge:	Direct discharge	<input type="checkbox"/> Air discharge	
		<input type="checkbox"/> Contact discharge	
	Indirect discharge	<input type="checkbox"/> Contact discharge	
Polarity:	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	
Discharge location:	<input type="checkbox"/> see photo documentation of the test set-up		
	<input type="checkbox"/> all external locations accessible by hand		
	<input type="checkbox"/> horizontal plate (HCP)		
	<input type="checkbox"/> vertical coupling plate (VCP)		

**5.2.5 Test result**The requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).

### 5.3 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.3.

#### 5.3.1 Description of the test location

Test location :	GTEM chamber
Power supply:	Battery 1.5V
Test condition:	Ambient Temperature: 24°C, Humidity:56%
Date of test :	05~09 May 2017
Operator :	Clark

#### 5.3.2 Severity levels of radiated, Radio-frequency, electromagnetic field

##### 5.3.2.1 Severity level: 3V/m

Level	Field strenght(V/m)
1	1
2	3
3	10
X	Special

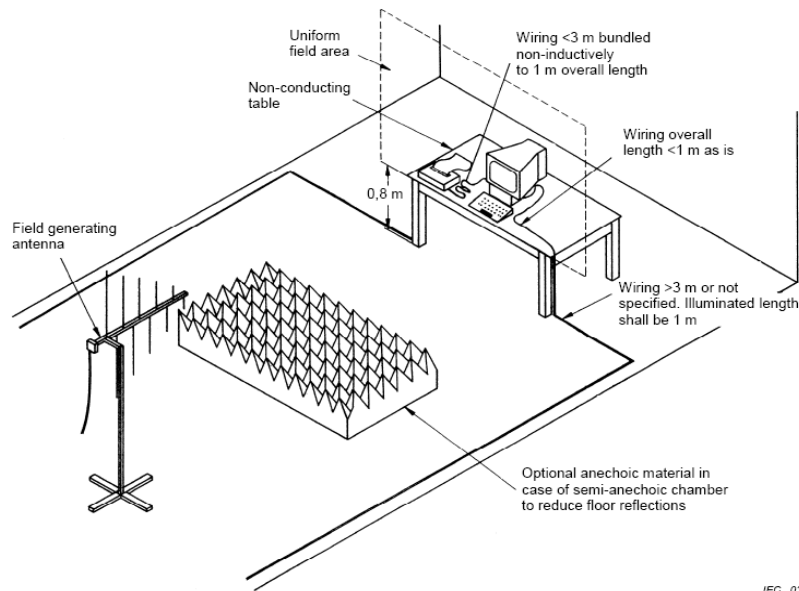
##### 5.3.2.2 Performance criterion: A

#### 5.3.3 Description of the test set-up

##### 5.3.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

##### 5.3.3.2 Block Diagram of Test Setup



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#### 5.3.4 Test specification:

Frequency range:	■ 80 MHz to 1000 MHz
Field strength:	■ 3 V/m
EUT - antenna separation:	■ 3 m
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz
Frequency step:	■ 1 % with 3 s dwell time
Antenna polarisation:	■ horizontal      ■ vertical

#### 5.3.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 6 USED TEST EQUIPMENT

### 6.1

Radiated disturbance (electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2017/04/26
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2016/10/24
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2017/03/29
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2017/03/29
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2017/03/29
6	Pre-Amplifier	EMC	EMC330	980113	2017/04/26
7	Pre-Amplifier	EMC	EMC012645	980114	2017/04/26
8	EMI Test Software	Farad	EZ-EMC	N/A	N/A

### 6.2

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 230	106003	2017/01/06

### 6.3

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	SMY 01	843215/014	2016/10/24
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2016/10/24
3	Amplifier	KALMUS	713FC	7385-1	2016/10/24
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2016/10/24
5	Field Probe	ETS	HI-6005	00075047	2016/10/24
6	RS Test Software	Farad	EZ-RS	N/A	N/A

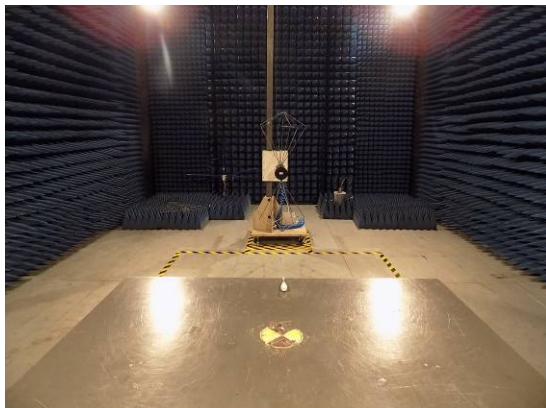
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## 7 TEST PHOTOGRAPHS

7.1. Photo of radiated emission measurement (R.E. Electric field)



7.2. Photo of electrostatic discharge Immunity measurement (E.S.D.)



7.3. Photo of RF field strength Immunity measurement (R.S.)



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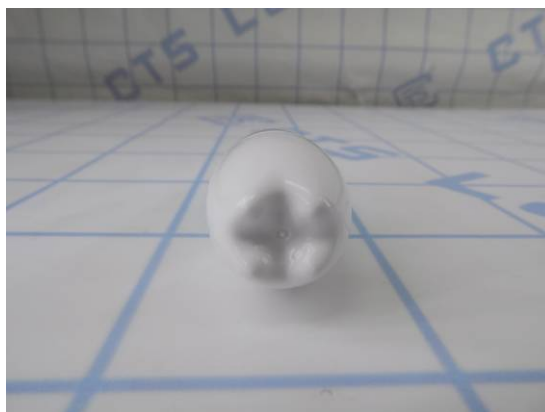
## 8 External and Internal Photos of the EUT



External view 1



External view 2



External view 3

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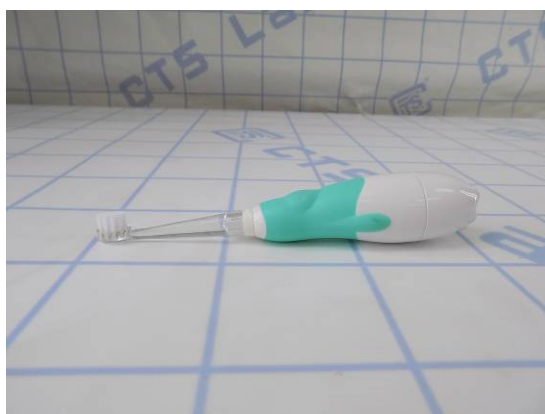
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External view 4



External view 5



External view 6

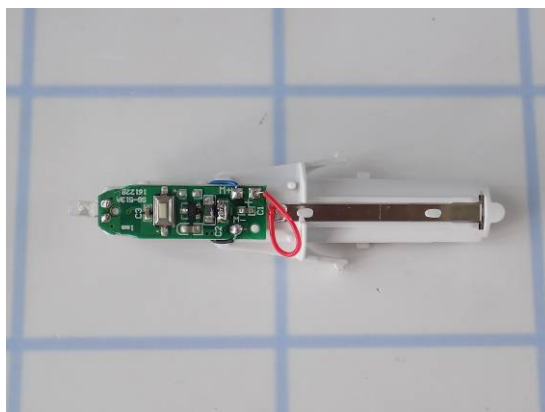
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Internal view 1



Internal view 2



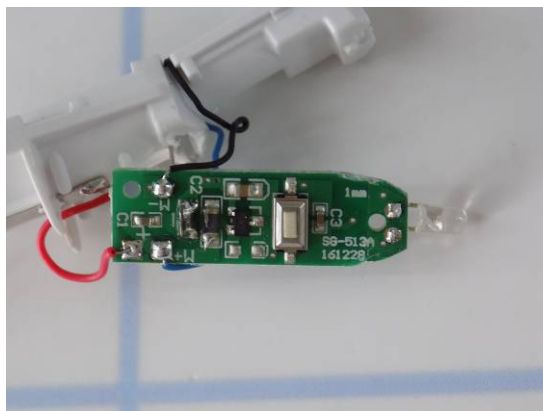
Internal view 3

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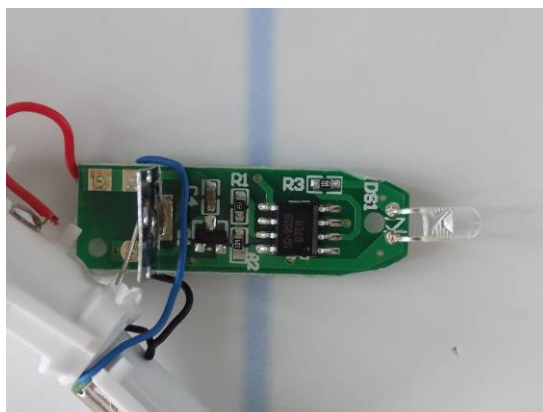
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PCB view 1



PCB view 2

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## 9 Manufacturer/ Approval holder Declaration

The following identical model(s):

N/A

Belong to the tested device:

Product description: **SONIC TOOTHBRUSH**

Model name: **SG-513**