



FCC RF Test Report

(WPT)

Report No.: JYTSZ-R12-2301819

Applicant: NINGBO SEAGO ELECTRIC CO., LTD

Address of Applicant: NO.239 JIANGHU ROAD,JIANGBEI DISTRICT, NINGBO, CHINA

Equipment Under Test (EUT)

Product Name: sonic toothbrush

Model No.: SG-982

Trade Mark: seago

FCC ID: 2BC87SG-982

Applicable Standards: FCC CFR Title 47 Part 15C (§15.209)

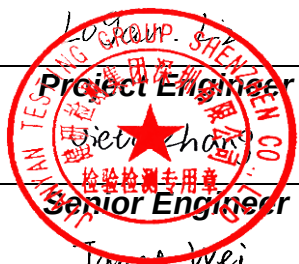
Date of Sample Receipt: 25 Dec., 2023

Date of Test: 26 Dec., 2023 to 02 Feb., 2024

Date of Report Issue: 02 Feb., 2024

Test Result: PASS

Tested by:


Project Engineer
Senior Engineer
JianYan Wei
Manager

Date:

02 Feb., 2024

Reviewed by:

Date:

02 Feb., 2024

Approved by:

Date:

02 Feb., 2024

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

1 Version

Version No.	Date	Description
00	10 Jan., 2024	Original
01	02 Feb., 2024	Update page7/15/17

2 Contents

	Page
Cover Page	1
1 Version	2
2 Contents	3
3 General Information	4
3.1 Client Information	4
3.2 General Description of E.U.T.	4
3.3 Test Mode and Environment	5
3.4 Description of Test Auxiliary Equipment	5
3.5 Measurement Uncertainty	5
3.6 Additions to, Deviations, or Exclusions From the Method	5
3.7 Laboratory Facility	6
3.8 Laboratory Location	6
3.9 Test Instruments List	7
4 Measurement Setup and Procedure	8
4.1 Test Setup	8
4.2 Test Procedure	9
5 Test Results	10
5.1 Summary	10
5.1.1 Clause and Data Summary	10
5.1.2 Test Limit	10
5.2 Antenna Requirement	11
5.3 AC Power Line Conducted Emission	12
5.4 20dB Bandwidth	14
5.5 Field Strength of Fundamental	15
5.6 Field Strength of Spurious Emissions	16

3 General Information

3.1 Client Information

Applicant:	NINGBO SEAGO ELECTRIC CO., LTD
Address:	NO.239 JIANGHU ROAD, JIANGBEI DISTRICT, NINGBO, CHINA
Manufacturer/Factory:	NINGBO SEAGO ELECTRIC CO., LTD
Address:	NO.239 JIANGHU ROAD, JIANGBEI DISTRICT, NINGBO, CHINA

3.2 General Description of E.U.T.

Product Name:	sonic toothbrush
Model No.:	SG-982
Operation Frequency:	112.20kHz
Modulation Type:	ASK
Antenna Type:	Coil Antenna
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Power Supply:	Rechargeable Li-ion Battery DC3.7V, 1450mAh
Wireless Charger:	Model: SG-982 Input: DC 5V, 1.5W Output Wireless: 0.6W
AC Adapter:	Model: M11US Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1A

3.3 Test Mode and Environment

Test Mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation
<i>Remark: the report only reflects the worse mode.</i>	
Operating Environment:	
Temperature:	15°C ~ 35°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.70 Vdc
Test Engineer:	Logan (Conducted measurement) Kiran (Radiated measurement)

3.4 Description of Test Auxiliary Equipment

Manufacturer	Description	Model	S/N	FCC ID/DoC
Skytek	Wireless charging match load	N/A	N/A	N/A
Shenzhen HengChangshengding Electronics Co., Ltd.	Adapter	HCSD-12650100	N/A	N/A

3.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Conducted Emission for LISN (9kHz ~ 150kHz)	3.57 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	3.14 dB
Radiated Emission (9kHz ~ 30MHz) (3m SAC)	3.3 dB
Radiated Emission (30MHz ~ 200MHz) (3m SAC)	4.6 dB
Radiated Emission (200MHz ~ 1000MHz) (3m SAC)	5.8 dB
Radiated Emission (1GHz ~ 6GHz) (3m SAC)	4.5 dB
Radiated Emission (6GHz ~ 18GHz) (3m SAC)	4.7 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	5.34 dB
<i>Note: All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.</i>	

3.6 Additions to, Deviations, or Exclusions From the Method

No

3.7 Laboratory Facility

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

● **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

● **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

● **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.

Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: <http://jyt.lets.com>

3.9 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
Loop Antenna	Schwarzbeck	FMZB 1519 B	WXJ002-4	02-09-2023	02-08-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
				12-27-2023	12-26-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	01-11-2023	01-10-2024
				12-27-2023	12-26-2024
Coaxial Cable (9kHz ~ 30MHz)	JYT	JYT3M-1G-BB-5M	WXG001-6	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
				01-17-2024	01-16-2025
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		
EMI Test Software	AUDIX	E3	Version: 6.110919b		

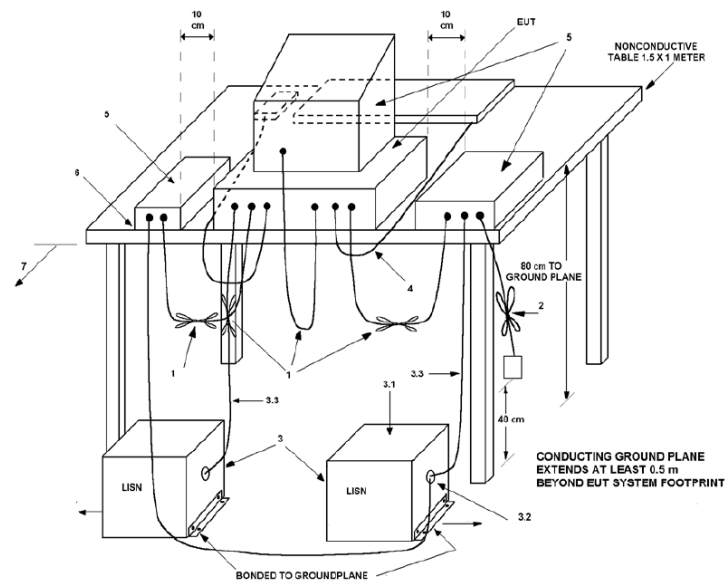
Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	07-05-2023	07-04-2024
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	01-10-2023	01-09-2024
				12-27-2023	12-26-2024
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	01-11-2023	01-10-2024
				12-27-2023	12-26-2024
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	02-22-2023	02-21-2024
RF Switch	TOP PRECISION	RSU0301	WXG003	N/A	
Test Software	AUDIX	E3	Version: 6.110919b		

Conducted Method:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI 3	WXJ003	01-10-2023	01-09-2024
				12-27-2023	12-26-2024
Spectrum analyzer	Rohde & Schwarz	FSP30	WXJ004	01-10-2023	01-09-2024
				12-27-2023	12-26-2024
Spectrum Analyzer	Keysight	N9020B	WXJ081-1	06-13-2023	06-12-2024

4 Measurement Setup and Procedure

4.1 Test Setup

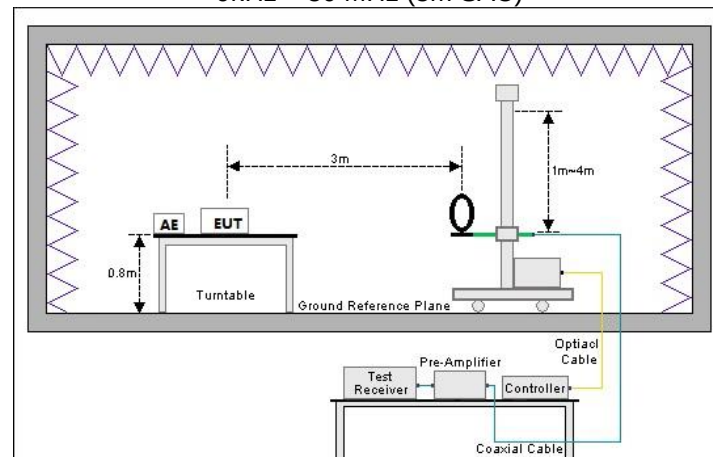
1) Conducted emission measurement:



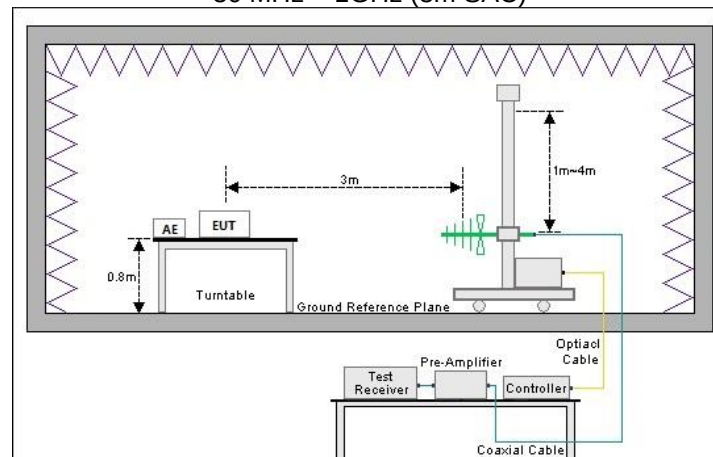
Note: The detailed descriptions please refer to Figure 8 of ANSI C63.4:2014.

2) Radiated emission measurement:

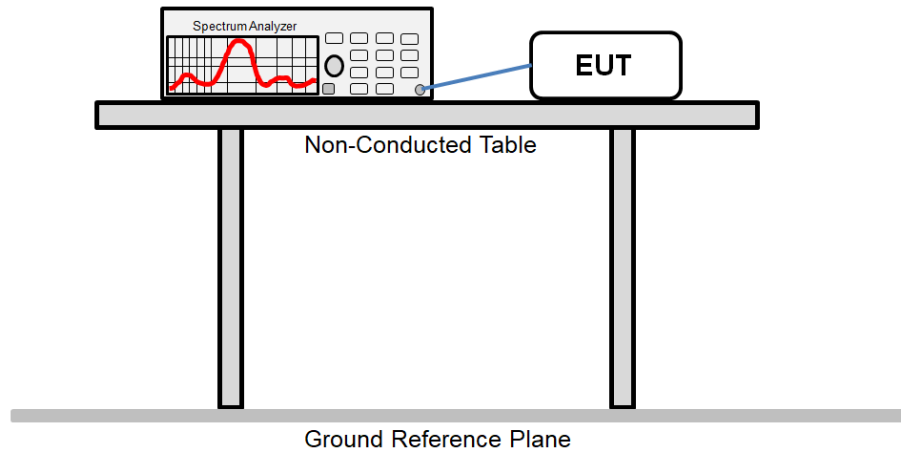
9kHz ~ 30 MHz (3m SAC)



30 MHz ~ 1GHz (3m SAC)



Conducted test method:



4.2 Test Procedure

Test method	Test step
Conducted emission	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. 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 on conducted measurement.
Radiated emission	1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method	1. The antenna port of EUT was connected to the RF port of the spectrum analyzer through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. The test data is saved by the screenshot function of the spectrum analyzer.

5 Test Results

5.1 Summary

5.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203	See Section 5.2	Pass
AC Power Line Conducted Emission	15.207	See Section 5.3	Pass
20dB Bandwidth	15.215(c)	See Section 5.4	Pass
Field Strength of Fundamental	15.209	See Section 5.5	Pass
Field Strength of Spurious Emissions	15.209	See Section 5.6	Pass
Remark: 1. Pass: The EUT complies with the essential requirements in the standard.			
Test Method:	ANSI C63.4-2014 ANSI C63.10-2013		

5.1.2 Test Limit

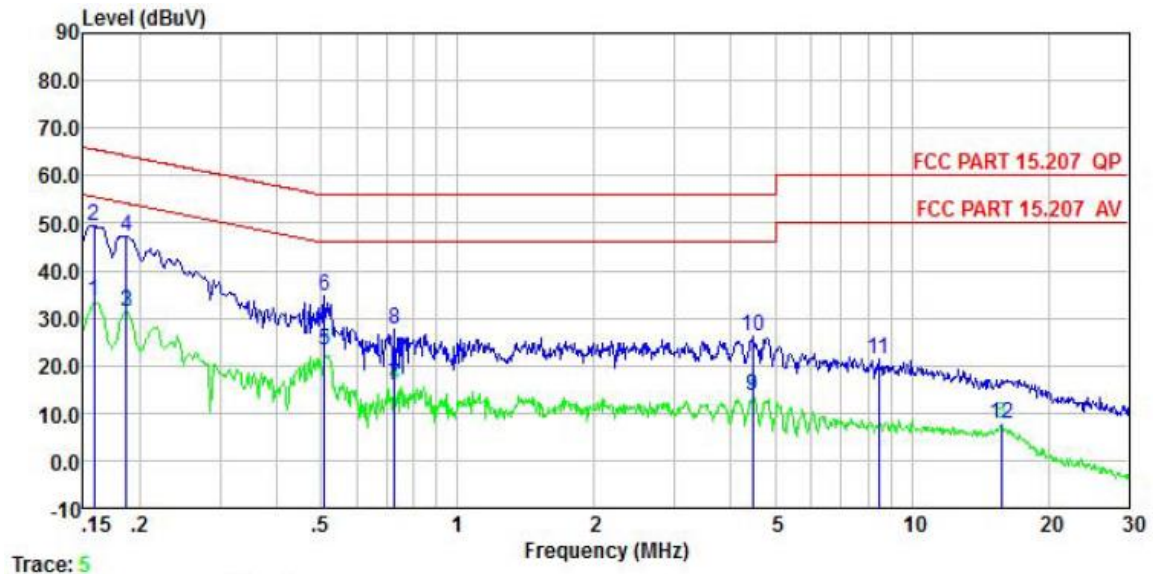
Test items	Limit																								
AC Power Line Conducted Emission	<table><tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>Quasi-Peak</th><th>Average</th></tr><tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr><tr><td>0.5 – 5</td><td>56</td><td>46</td></tr><tr><td>5 – 30</td><td>60</td><td>50</td></tr></table> Note 1: The limit level in dBμV decreases linearly with the logarithm of frequency. Note 2: The more stringent limit applies at transition frequencies.	Frequency (MHz)	Limit (dBμV)		Quasi-Peak	Average	0.15 – 0.5	66 to 56 Note 1	56 to 46 Note 1	0.5 – 5	56	46	5 – 30	60	50										
Frequency (MHz)	Limit (dBμV)																								
	Quasi-Peak	Average																							
0.15 – 0.5	66 to 56 Note 1	56 to 46 Note 1																							
0.5 – 5	56	46																							
5 – 30	60	50																							
20dB Bandwidth	N/A																								
Field Strength of Fundamental	<table><tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr><tr><td>0.009 – 0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490 – 1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705 – 30.0</td><td>30</td><td>30</td></tr><tr><td>30 – 88</td><td>100**</td><td>3</td></tr><tr><td>88 – 216</td><td>150**</td><td>3</td></tr><tr><td>216 – 960</td><td>200**</td><td>3</td></tr><tr><td>Above 960</td><td>500</td><td>3</td></tr></table> ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009 – 0.490	2400/F(kHz)	300	0.490 – 1.705	24000/F(kHz)	30	1.705 – 30.0	30	30	30 – 88	100**	3	88 – 216	150**	3	216 – 960	200**	3	Above 960	500	3
Frequency (MHz)		Field strength (microvolts/meter)	Measurement distance (meters)																						
0.009 – 0.490		2400/F(kHz)	300																						
0.490 – 1.705		24000/F(kHz)	30																						
1.705 – 30.0		30	30																						
30 – 88		100**	3																						
88 – 216		150**	3																						
216 – 960		200**	3																						
Above 960	500	3																							
Field Strength of Spurious Emissions																									

5.2 Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
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.
E.U.T Antenna:	The EUT make use of a coil antenna.

5.3 AC Power Line Conducted Emission

Product name:	sonic toothbrush	Product model:	SG-982
Test by:	Asher	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120 V/60 Hz		

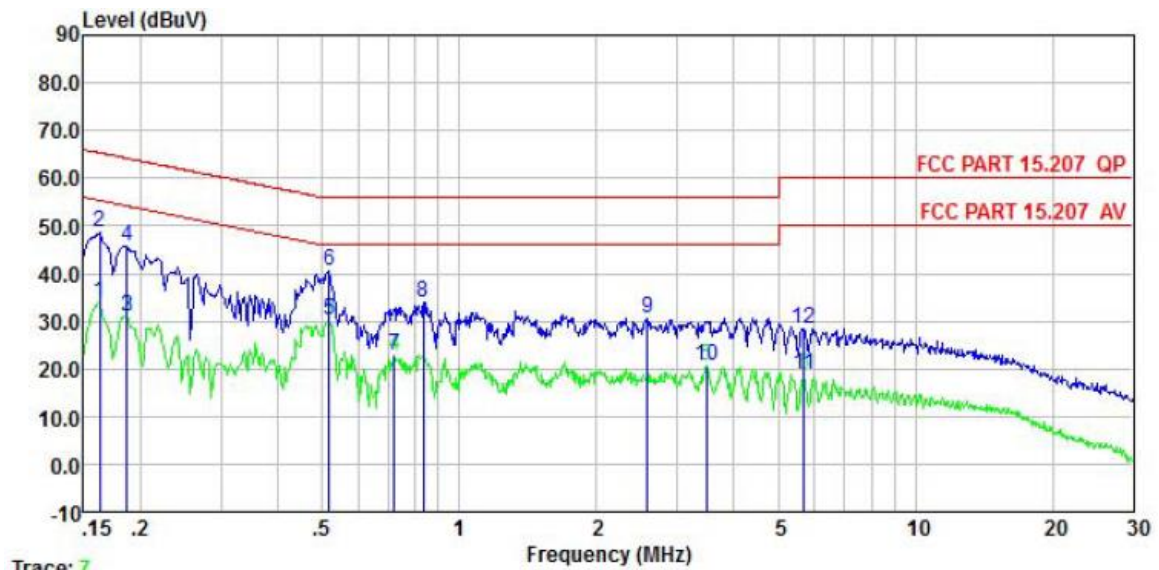


	Read Freq	Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.158	23.39	0.20	9.88	0.01	33.48	55.56	-22.08	Average
2	0.158	39.40	0.20	9.88	0.01	49.49	65.56	-16.07	QP
3	0.186	21.39	0.20	9.88	0.02	31.49	54.20	-22.71	Average
4	0.186	37.18	0.20	9.88	0.02	47.28	64.20	-16.92	QP
5	0.510	13.06	0.20	9.88	0.03	23.17	46.00	-22.83	Average
6	0.510	24.50	0.20	9.88	0.03	34.61	56.00	-21.39	QP
7	0.727	5.64	0.20	9.88	0.03	15.75	46.00	-30.25	Average
8	0.727	17.42	0.20	9.88	0.03	27.53	56.00	-28.47	QP
9	4.454	3.35	0.20	9.89	0.08	13.52	46.00	-32.48	Average
10	4.454	16.15	0.20	9.89	0.08	26.32	56.00	-29.68	QP
11	8.456	11.17	0.20	9.91	0.10	21.38	60.00	-38.62	QP
12	15.718	-2.71	0.21	9.93	0.15	7.58	50.00	-42.42	Average

Remark:

1. Level = Read level + LISN Factor + Cable Loss.

Product name:	sonic toothbrush	Product model:	SG-982
Test by:	Asher	Test mode:	Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz		



	Freq	Read Level	LISN Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.162	23.87	0.20	9.88	0.01	33.96	55.34	-21.38	Average
2	0.162	38.59	0.20	9.88	0.01	48.68	65.34	-16.66	QP
3	0.186	20.94	0.20	9.88	0.02	31.04	54.20	-23.16	Average
4	0.186	35.70	0.20	9.88	0.02	45.80	64.20	-18.40	QP
5	0.518	20.00	0.20	9.88	0.03	30.11	46.00	-15.89	Average
6	0.518	30.37	0.20	9.88	0.03	40.48	56.00	-15.52	QP
7	0.720	12.83	0.20	9.88	0.03	22.94	46.00	-23.06	Average
8	0.835	23.72	0.20	9.88	0.03	33.83	56.00	-22.17	QP
9	2.581	20.24	0.30	9.88	0.12	30.54	56.00	-25.46	QP
10	3.472	10.23	0.30	9.89	0.08	20.50	46.00	-25.50	Average
11	5.683	8.53	0.30	9.90	0.09	18.82	50.00	-31.18	Average
12	5.683	18.22	0.30	9.90	0.09	28.51	60.00	-31.49	QP

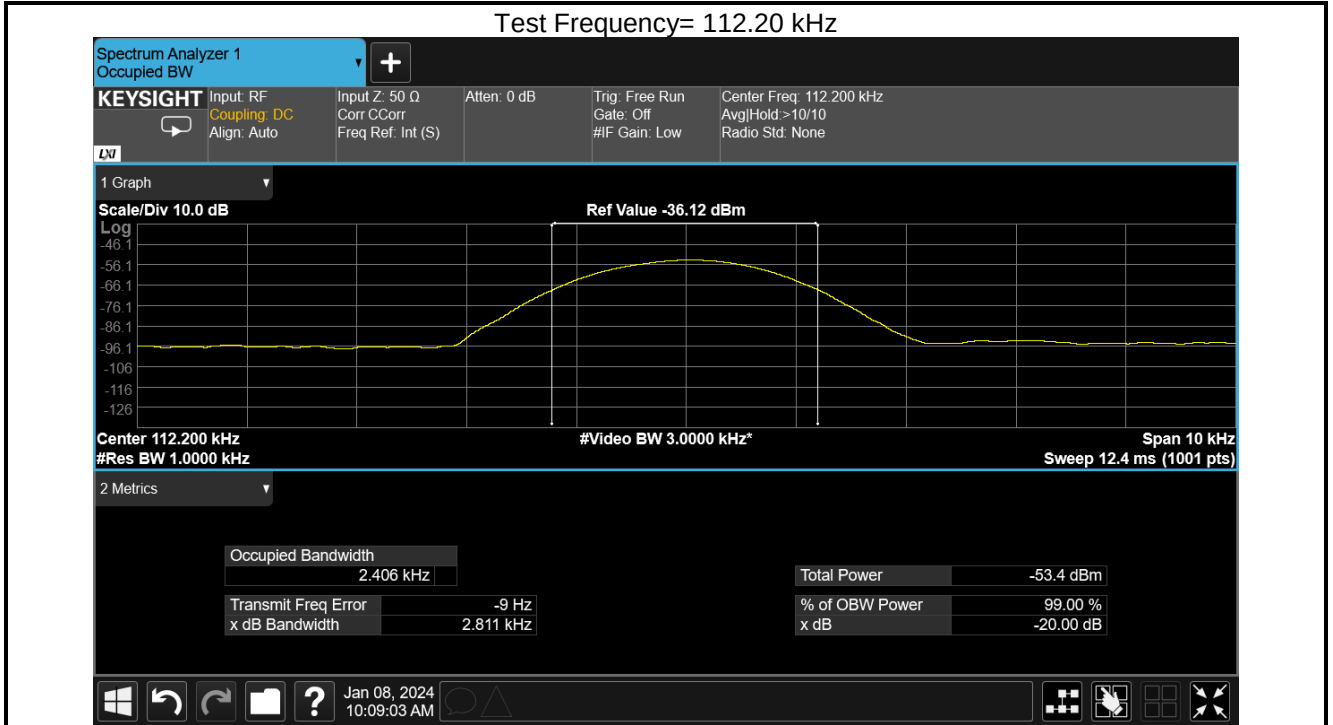
Remark:

1. Level = Read level + LISN Factor + Cable Loss.

5.4 20dB Bandwidth

20dB bandwidth (kHz)	Limits
2.811	N/A
Remark: For report purpose only.	

Test plot as follows:

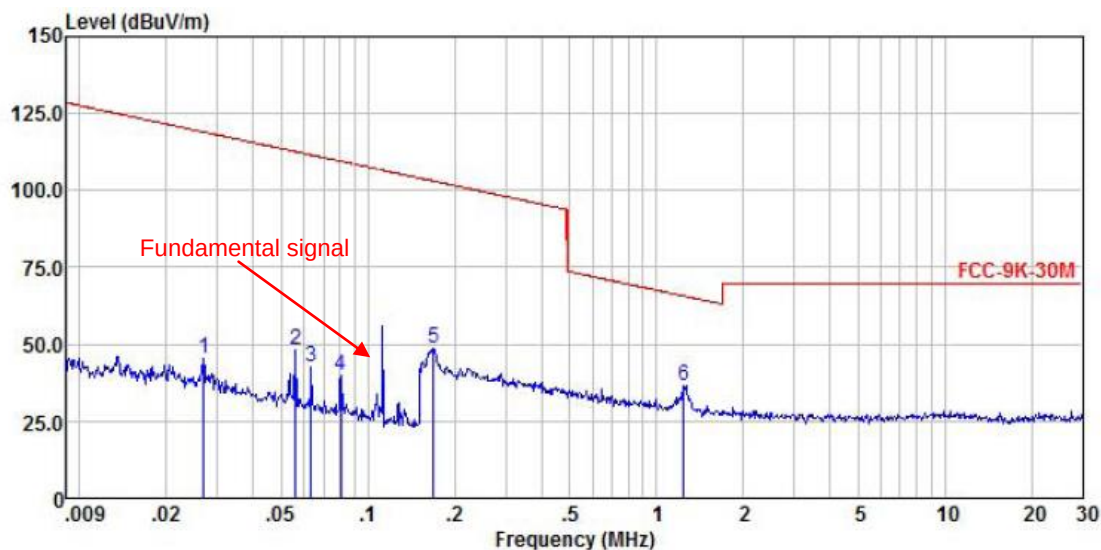


5.5 Field Strength of Fundamental

Peak Value					
Frequency (kHz)	H-field @3m (dBμV)	Limit @3m (dBμV)	Margin (dB)	Polarization	Result
112.2	65.56	83.65	18.09	Horizontal	Pass
112.2	59.80	83.65	23.85	Vertical	Pass
Average Value					
Frequency (kHz)	H-field@3m (dBμV)	Limit@3m (dBμV)	Margin (dB)	Polarization	Result
112.2	51.62	63.65	12.03	Horizontal	Pass
112.2	47.85	63.65	15.80	Vertical	Pass

5.6 Field Strength of Spurious Emissions

Product Name:	sonic toothbrush	Product Model:	SG-982
Test By:	Kiran	Test mode:	Tx mode
Test Frequency:	9 kHz – 30 MHz	Polarization:	Coxial
Test Voltage:	AC 120V/60Hz		

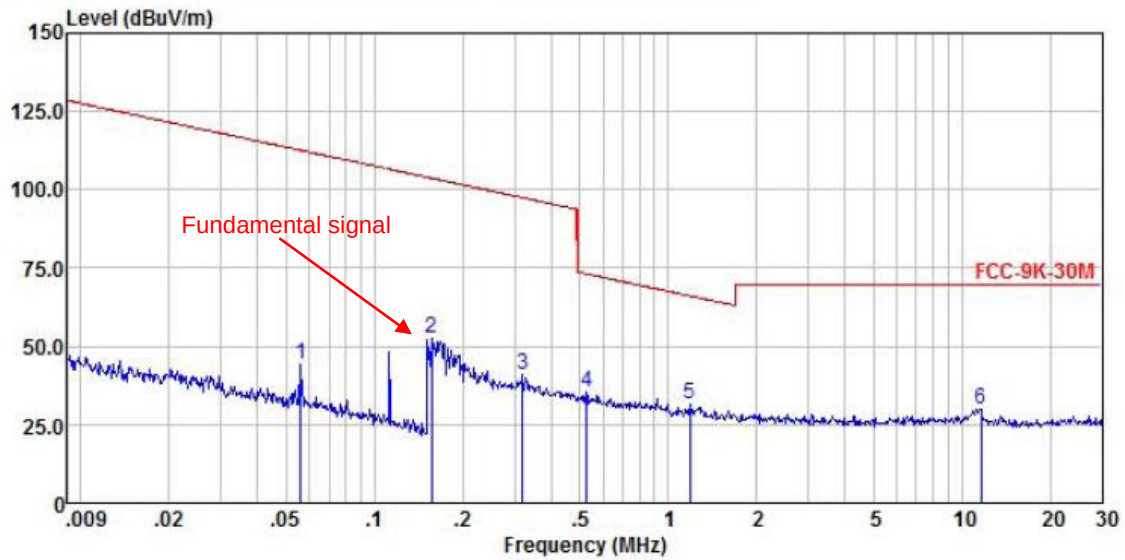


	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	0.027	24.96	20.23	0.01	0.00	45.20	118.99 -73.79 Peak
2	0.056	27.75	20.56	0.02	0.00	48.33	112.58 -64.25 Peak
3	0.064	22.06	20.53	0.02	0.00	42.61	111.52 -68.91 Peak
4	0.080	18.99	20.61	0.02	0.00	39.62	109.48 -69.86 Peak
5	0.168	28.20	20.26	0.03	0.00	48.49	103.10 -54.61 Peak
6	1.248	16.07	20.48	0.17	0.00	36.72	65.70 -28.98 Peak

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Product Name:	sonic toothbrush	Product Model:	SG-982
Test By:	Kiran	Test mode:	Tx mode
Test Frequency:	9 kHz – 30 MHz	Polarization:	Coplanar
Test Voltage:	AC 120V/60Hz		

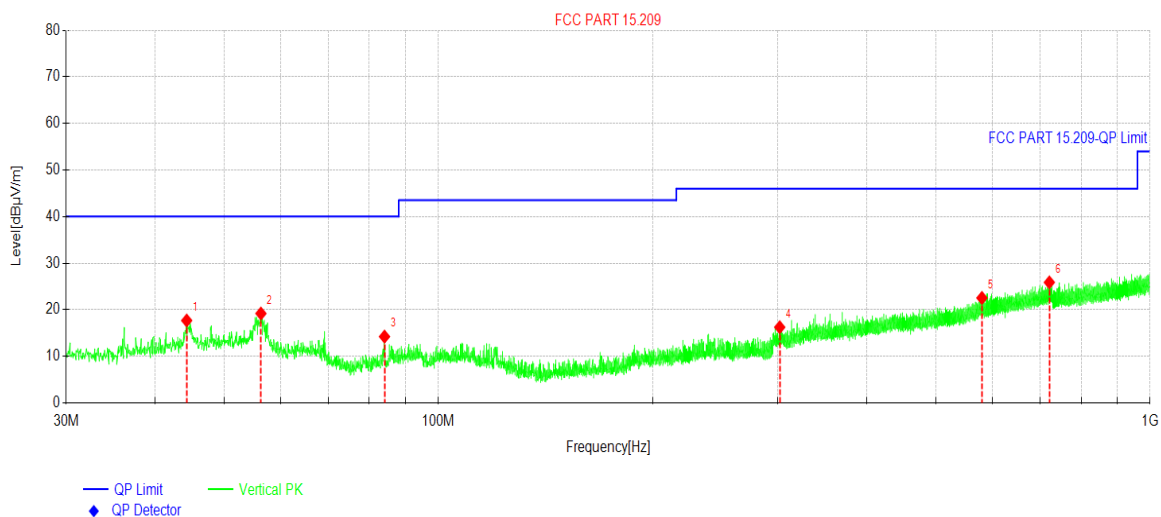


	ReadAntenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	0.056	23.60	20.56	0.02	0.00	44.18
2	0.156	32.09	20.22	0.03	0.00	52.34
3	0.319	20.34	20.58	0.06	0.00	40.98
4	0.528	14.50	20.78	0.09	0.00	35.37
5	1.189	10.90	20.48	0.17	0.00	31.55
6	11.613	9.50	20.03	0.41	0.00	29.94

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

Product Name:	sonic toothbrush	Product Model:	SG-982
Test By:	Robin	Test mode:	Tx mode
Test Frequency:	30 MHz – 1000 MHz	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



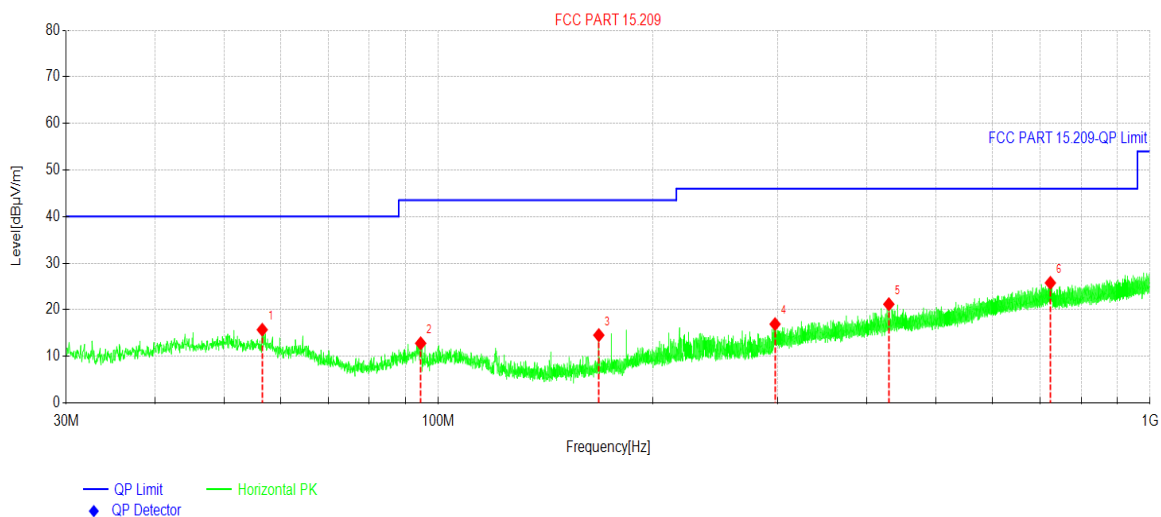
Suspected Data List

NO.	Freq. [MHz]	Reading[dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	44.3082	30.63	-12.95	17.68	40.00	22.32	PK	Vertical
2	56.3368	32.41	-13.22	19.19	40.00	20.81	PK	Vertical
3	84.0317	32.05	-17.83	14.22	40.00	25.78	PK	Vertical
4	301.759	29.09	-12.85	16.24	46.00	29.76	PK	Vertical
5	580.551	29.77	-7.24	22.53	46.00	23.47	PK	Vertical
6	721.984	30.48	-4.61	25.87	46.00	20.13	PK	Vertical

Remark:

1. Level = Reading+ Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	sonic toothbrush	Product Model:	SG-982
Test By:	Robin	Test mode:	Tx mode
Test Frequency:	30 MHz – 1000 MHz	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Suspected Data List

NO.	Freq. [MHz]	Reading[dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	56.5793	28.99	-13.29	15.70	40.00	24.30	PK	Horizontal
2	94.4597	28.36	-15.57	12.79	43.50	30.71	PK	Horizontal
3	168.086	31.73	-17.19	14.54	43.50	28.96	PK	Horizontal
4	297.248	29.84	-12.93	16.91	46.00	29.09	PK	Horizontal
5	429.563	31.12	-9.94	21.18	46.00	24.82	PK	Horizontal
6	724.312	30.34	-4.58	25.76	46.00	20.24	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

-----End of report-----