

FCC TEST REPORT

Product : Peak Flow Meter
Trade mark : N/A
Model/Type reference : MSA100
Serial Number : N/A
Report Number : EED32I001474
FCCID : 2AIV3-MB-MSA100
Date of Issue : Jun. 28, 2016
Test Standards : 47 CFR Part 15 Subpart B (2015)
Test result : PASS

Prepared for:

Beijing M&B Electronic Instruments Co., LTD
No. 27, Yongwang Road, Beijing Bioengineering and Medicine Industry
Base, Huangcun Town, Daxing district, Beijing, CHINA

Prepared by:

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Date:

Jun. 28, 2016

Check No.: 2447612696



2 Version

Version No.	Date	Description
00	Jun. 28, 2016	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15B	ANSI C63.4-2014	PASS
Conducted Emission (150KHz to 30MHz)	47 CFR Part 15B	ANSI C63.4-2014	PASS

Remark:

The tested sample and the sample information are provided by the client.

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5 General Information

5.1 Client Information

Applicant:	Beijing M&B Electronic Instruments Co., LTD
Address of Applicant:	No. 27, Yongwang Road, Beijing Bioengineering and Medicine Industry Base, Huangcun Town, Daxing district, Beijing, CHINA
Manufacturer:	Beijing M&B Electronic Instruments Co., LTD
Address of Manufacturer:	No. 27, Yongwang Road, Beijing Bioengineering and Medicine Industry Base, Huangcun Town, Daxing district, Beijing, CHINA
Factory:	Beijing M&B Electronic Instruments Co., LTD
Address of Factory:	No. 27, Yongwang Road, Beijing Bioengineering and Medicine Industry Base, Huangcun Town, Daxing district, Beijing, CHINA

5.2 General Description of EUT

Product Name:	Peak Flow Meter
Mode No.(EUT):	MSA100
Trade Mark:	N/A
Power Supply:	2xAAA alkaline battery=3.0V
USB Cable:	30cm(Unshielded)

5.3 Product Specification subjective to this standard

Test power grade:	NA (manufacturer declare)
Test software of EUT:	NA (manufacturer declare)
HardwareVersion:	MSA100 V4 (manufacturer declare)
Software Version:	1.12 (manufacturer declare)
Test voltage:	AC 120V, 60Hz
Sample Received Date:	Jun. 12, 2016
Sample tested Date:	Jun. 12, 2016 to Jun. 16, 2016

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	21°C
Humidity:	54% RH
Atmospheric Pressure:	1010mbar
Test mode:	
Read & Write Int. memory:	Connect EUT and PC, exchanging data with Int. memory

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name		Manufacture	S/N	Supplied by
AE1	Laptop	Lenovo	EB22995690	CTI
AE2	Mouse	L.Selectron	NA	CTI
AE3	USB Cable	NA	NA	CTI

5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

5.7 Test Facility

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

CNAS-Lab Code: L1910

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

A2LA-Lab Cert. No. 3061.01

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 886427

Centre Testing International Group 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 886427.

IC-Registration No.: 7408A-2

The 3m Alternate Test Site of Centre Testing International (Shenzhen) Corporation. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A-2 .

IC-Registration No.: 7408B-1

The 10m Alternate Test Site of Centre Testing International (Shenzhen) Corporation., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B-1.

NEMKO-Aut. No.: ELA503

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

VCCI

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of

Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758.

5.8 Deviation from Standards

None.

5.9 Abnormalities from Standard Conditions

None.

5.10 Other Information Requested by the Customer

None.

5.11 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	Radiated Spurious emission	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
3	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
4	Temperature	0.64°C
5	Humidity	2.8%
6	DC power voltages	0.025%

6 Equipment List

Conducted disturbance Test					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100009	06-30-2015	06-28-2016
Temperature/ Humidity Indicator	Belida	TT-512	101	07-09-2015	07-07-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
LISN	R&S	ENV216	100098	06-30-2015	06-28-2016
LISN	schwarzbeck	NNLK8121	8121-529	06-30-2015	06-28-2016
Voltage Probe	R&S	ESH2-Z3	100042	07-09-2014	07-08-2017
Current Probe	R&S	EZ17	100106	07-09-2014	07-08-2017
ISN	TESEQ GmbH	ISN T800	30297	01-29-2015	01-27-2017

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-02-2013	06-01-2016
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-01-2016	05-31-2019
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-484	05-23-2016	05-22-2017
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Horn Antenna	A.H.SYSTEMS	SAS-574	374	06-30-2015	06-29-2016
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Multi device Controller	maturo	NCD/070/10711 112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-30-2015	06-28-2016
LISN	schwarzbeck	NNBM8125	81251548	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	07- 08-2015	07-06-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(6-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03C L12-0394-001	---	01-12-2016	01-11-2017

7 Test results and Measurement Data

7.1 Conducted Emissions

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

Test frequency range: 150kHz to 30MHz

Limit:

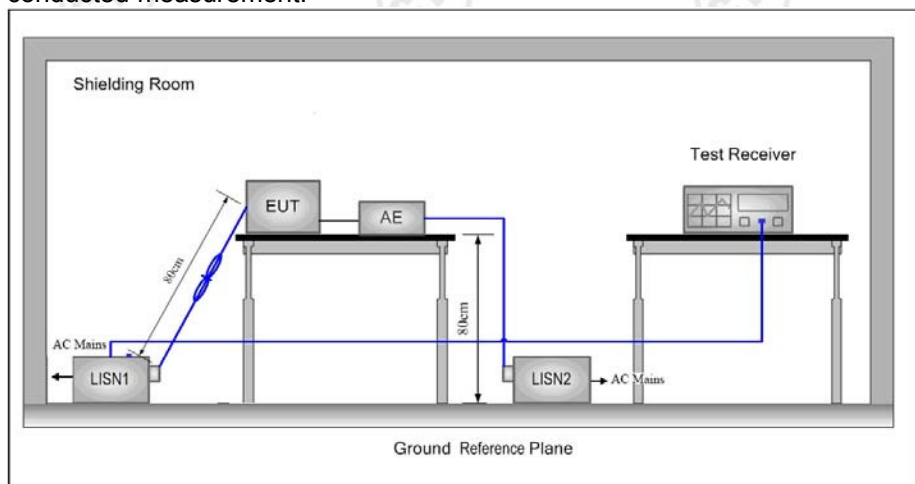
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.

Test Setup:



Instruments Used: Refer to section 6 for details

Test Results: Pass

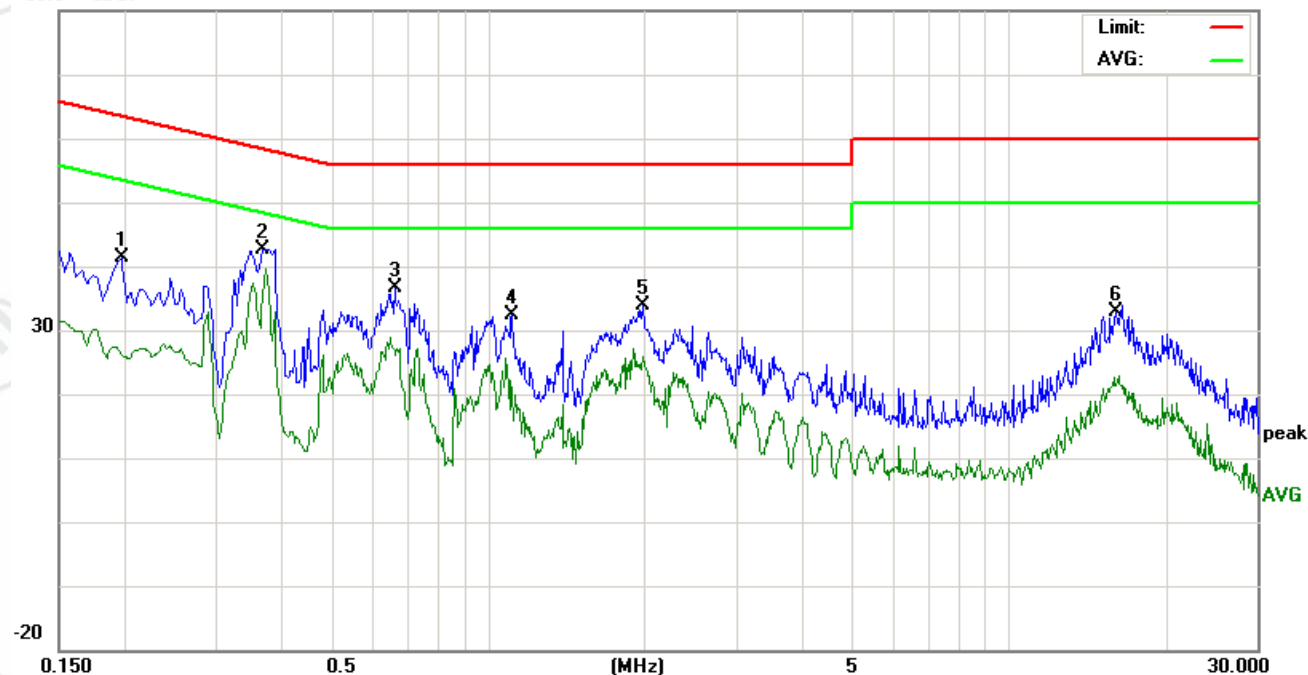
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:

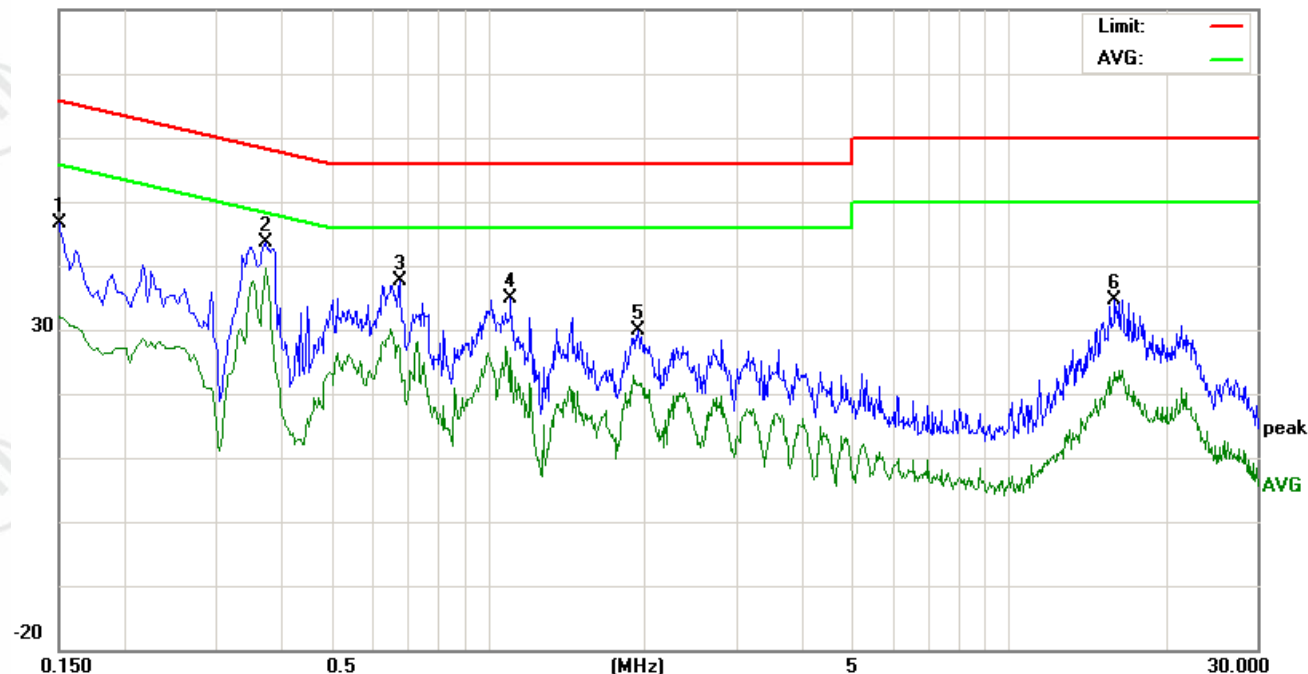
80.0 dBuV



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1980	31.50	27.61	16.42	9.80	41.30	37.41	26.22	63.69	53.69	-26.28	-27.47	P	
2	0.3700	32.76	29.81	25.43	9.87	42.63	39.68	35.30	58.50	48.50	-18.82	-13.20	P	
3	0.6620	26.61	22.55	17.07	9.90	36.51	32.45	26.97	56.00	46.00	-23.55	-19.03	P	
4	1.1140	22.36	19.37	10.39	10.00	32.36	29.37	20.39	56.00	46.00	-26.63	-25.61	P	
5	1.9820	23.95	20.14	15.78	10.00	33.95	30.14	25.78	56.00	46.00	-25.86	-20.22	P	
6	16.1100	22.70	19.62	11.15	10.19	32.89	29.81	21.34	60.00	50.00	-30.19	-28.66	P	

Neutral Line:

80.0 dBuV



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1500	36.90	33.38	22.22	9.80	46.70	43.18	32.02	65.99	55.99	-22.81	-23.97	P	
2	0.3740	33.82	30.17	29.79	9.87	43.69	40.04	39.66	58.41	48.41	-18.37	-8.75	P	
3	0.6780	27.81	24.95	17.33	9.90	37.71	34.85	27.23	56.00	46.00	-21.15	-18.77	P	
4	1.1060	24.87	21.64	15.54	10.00	34.87	31.64	25.54	56.00	46.00	-24.36	-20.46	P	
5	1.9420	19.80	16.74	11.41	10.00	29.80	26.74	21.41	56.00	46.00	-29.26	-24.59	P	
6	16.0419	24.54	21.16	13.19	10.18	34.72	31.34	23.37	60.00	50.00	-28.66	-26.63	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

7.2 Radiated Emission

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

Test site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value

Limit:

Frequency	Limit (dBμV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Procedure:

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotating table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test Setup:

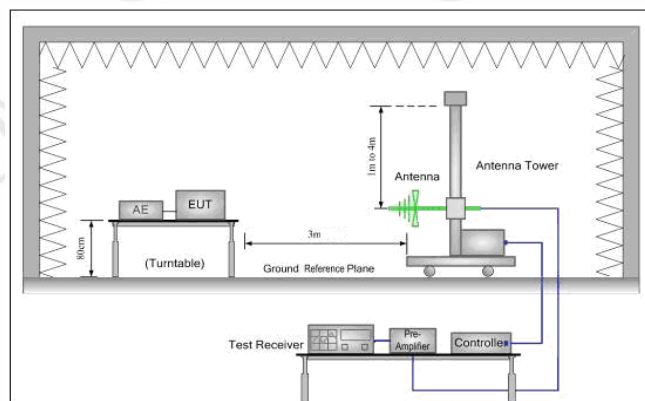


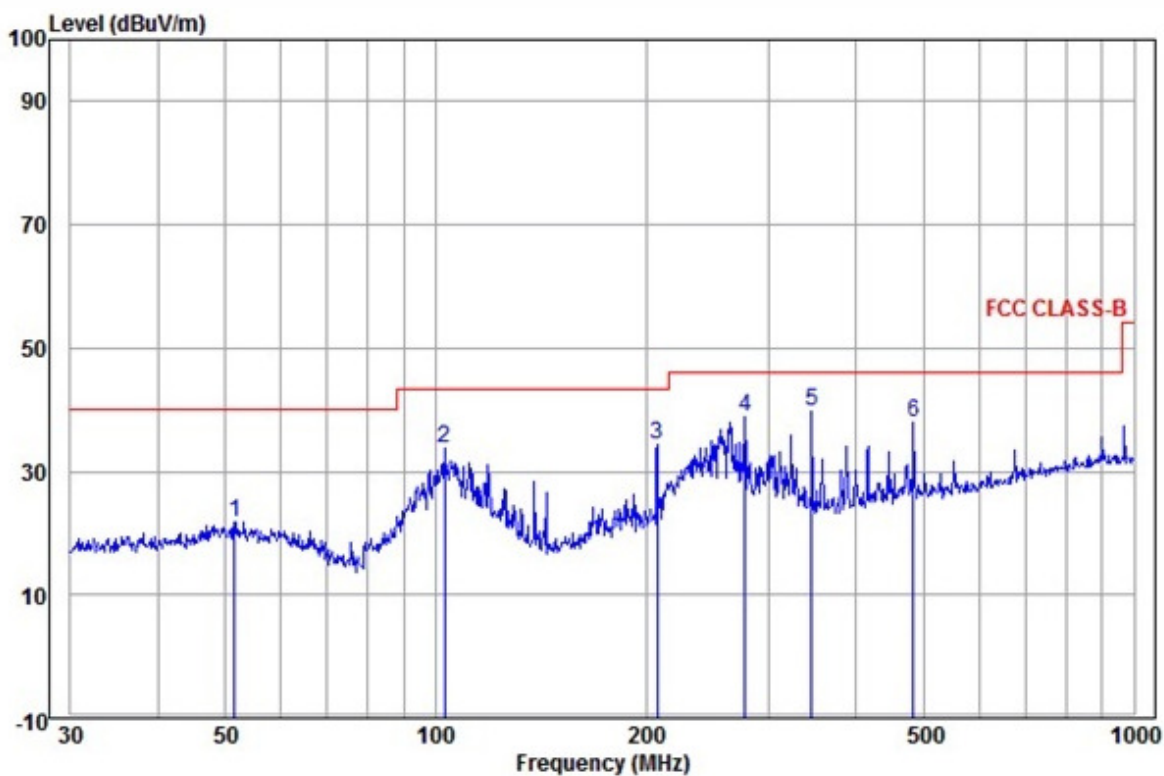
Figure 1. 30MHz to 1GHz

Instruments Used: Refer to section 6 for details

Test Results: Pass

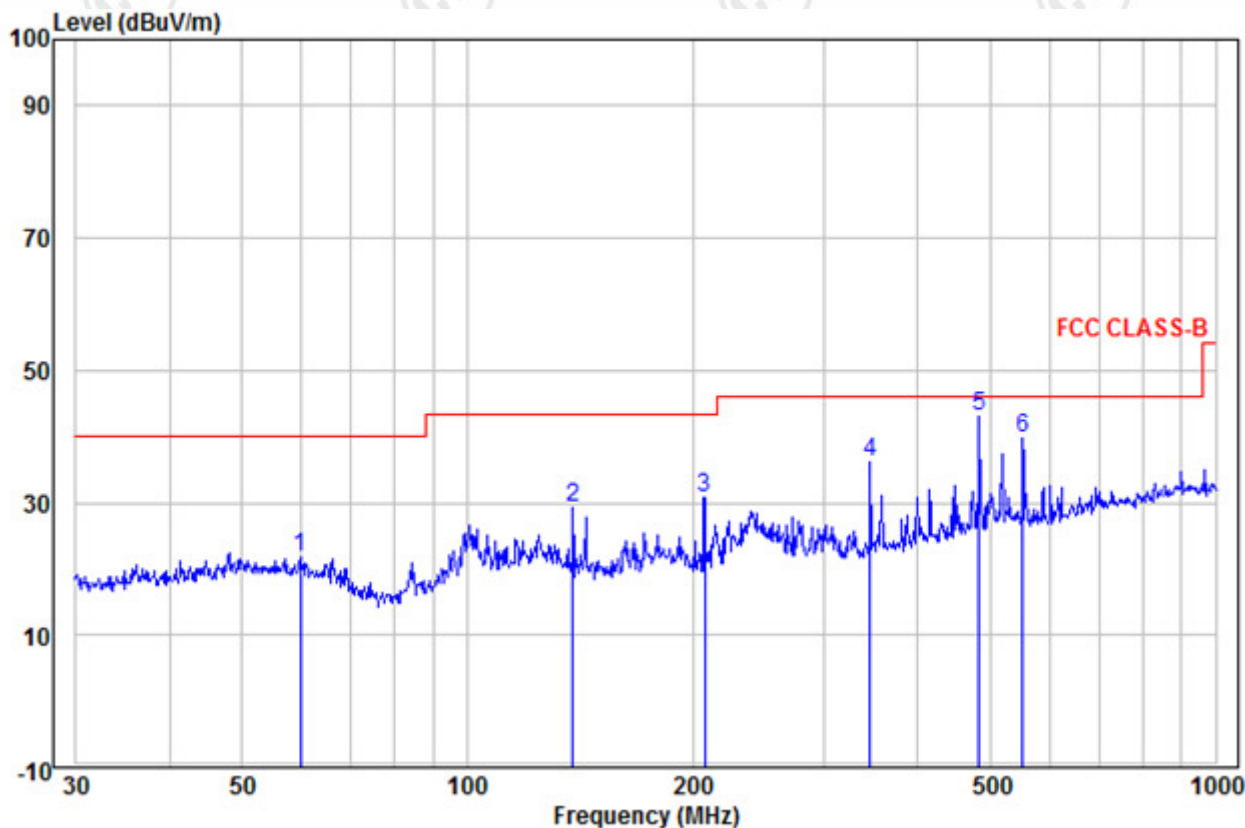
30MHz~1GHz

Horizontal



	Ant Freq	Cable Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	51.481	14.89	1.40	5.46	21.75	40.00	-18.25	Horizontal	
2	103.080	12.94	1.57	19.11	33.62	43.50	-9.88	Horizontal	
3	207.850	11.74	2.23	20.50	34.47	43.50	-9.03	Horizontal	
4	277.094	13.02	2.37	23.50	38.89	46.00	-7.11	Horizontal	
5 pp	345.595	14.69	2.68	22.43	39.80	46.00	-6.20	Horizontal	
6	483.910	18.00	3.09	16.88	37.97	46.00	-8.03	Horizontal	

Vertical



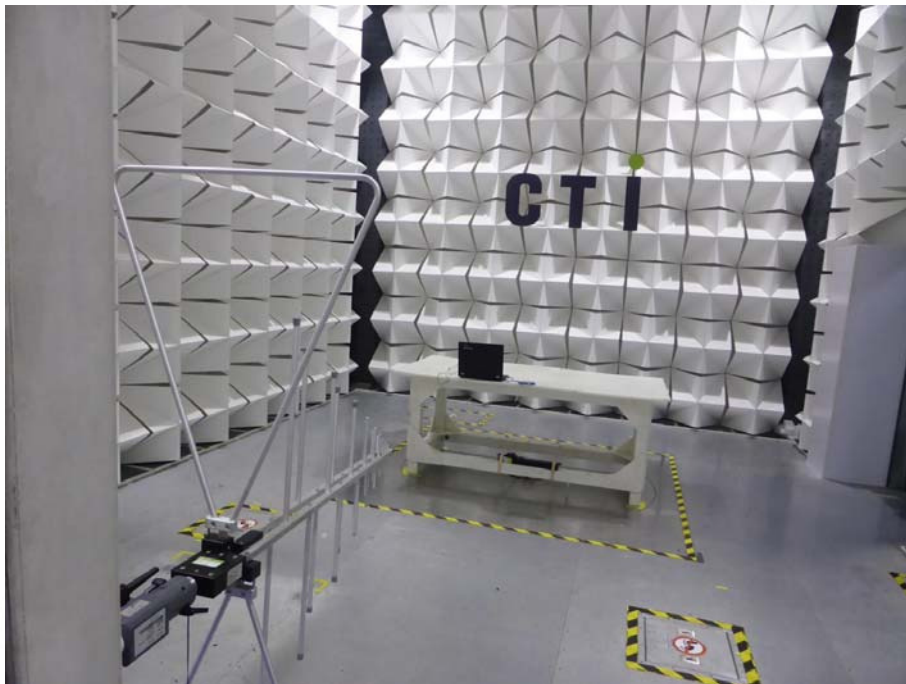
	Freq	Ant Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	59.859	13.82	1.43	6.40	21.65	40.00	-18.35	Vertical	
2	138.387	10.40	1.58	17.15	29.13	43.50	-14.37	Vertical	
3	207.850	11.74	2.23	16.73	30.70	43.50	-12.80	Vertical	
4	345.595	14.69	2.68	18.66	36.03	46.00	-9.97	Vertical	
5 pp	483.910	18.00	3.09	21.90	42.99	46.00	-3.01	Vertical	
6	552.883	18.61	3.23	18.03	39.87	46.00	-6.13	Vertical	

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading - Correct Factor
Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor
- The highest frequency of the internal sources of the EUT is less than 108 MHz, so the measurement shall only be made up to 1 GHz.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: MSA100



Radiated emission Test Setup(30MHz-1GHz)



Conducted Emissions

APPENDIX 2 PHOTOGRAPHS OF EUT

Test mode No.: MSA100



View of Product-1



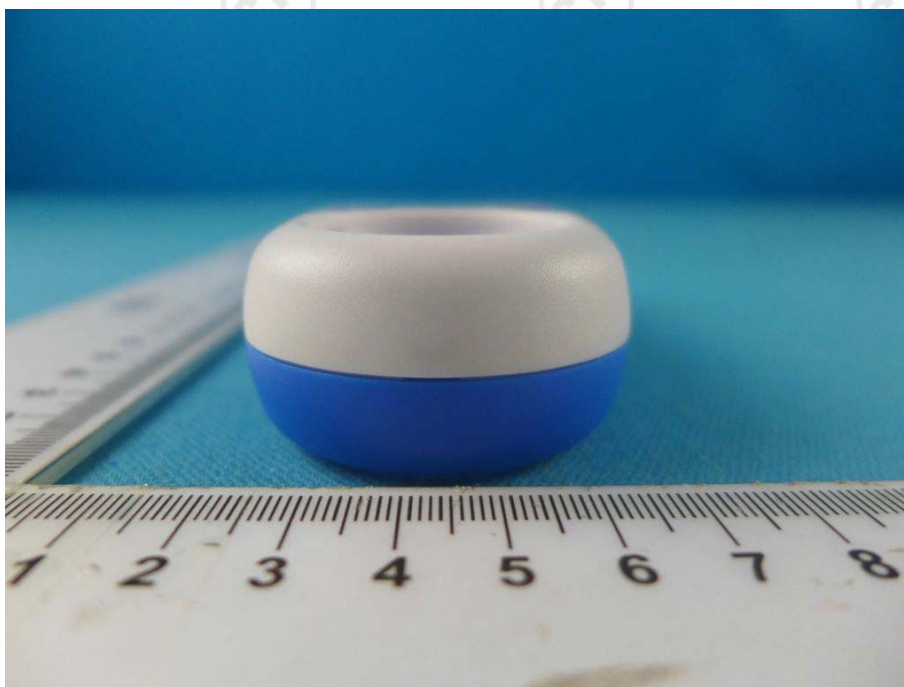
View of Product-2



View of Product-3



View of Product-4



View of Product-5



View of Product-6



View of Product-7



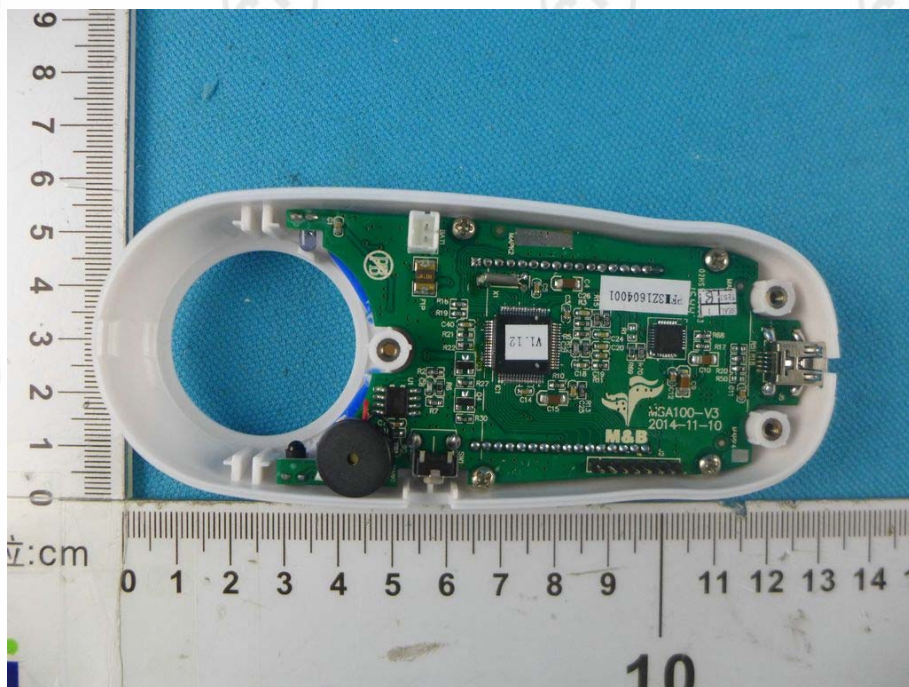
View of Product-8



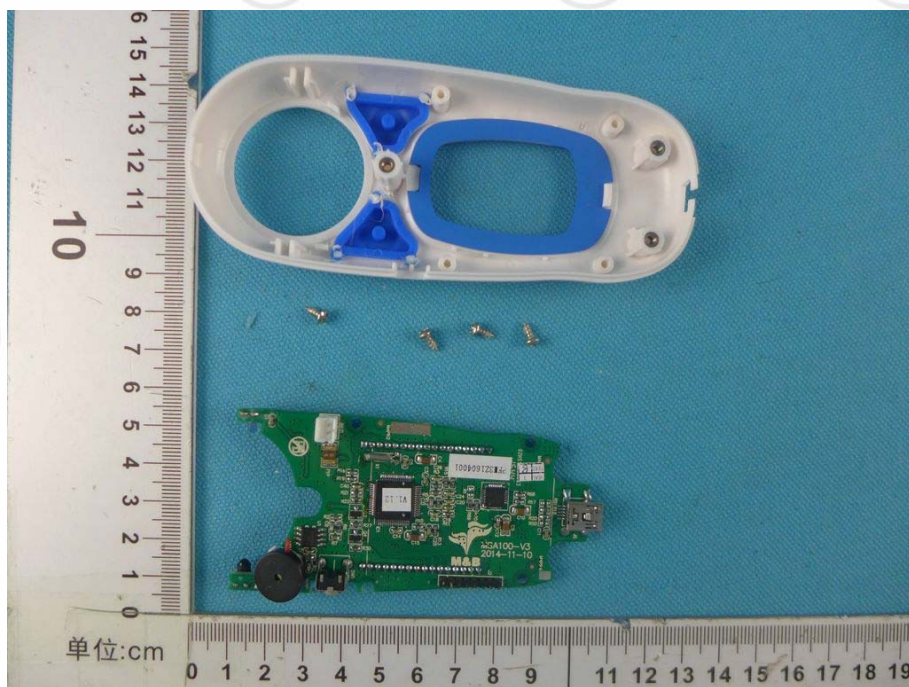
View of Product-9



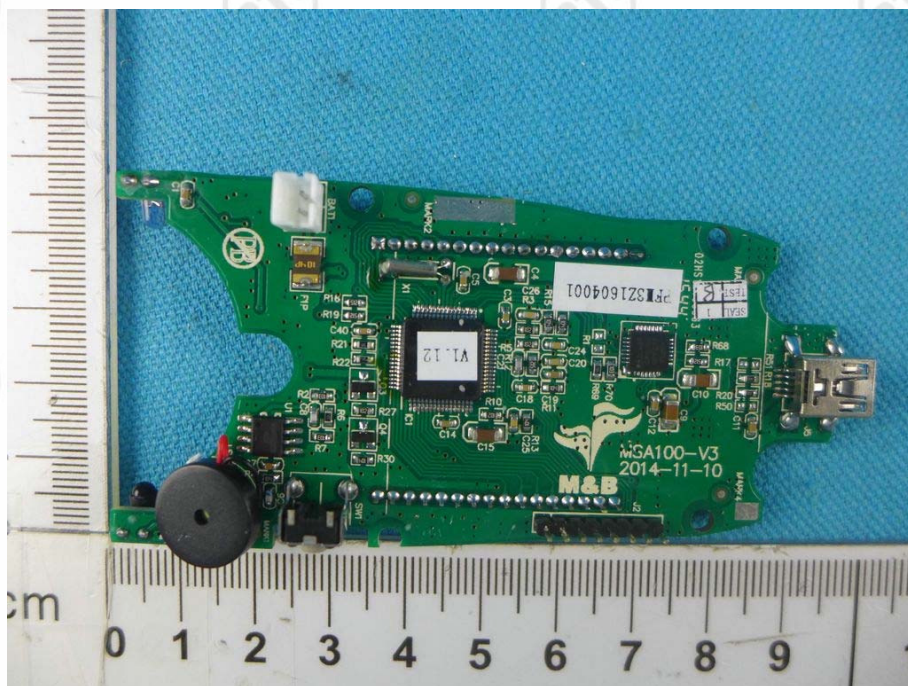
View of Product-10



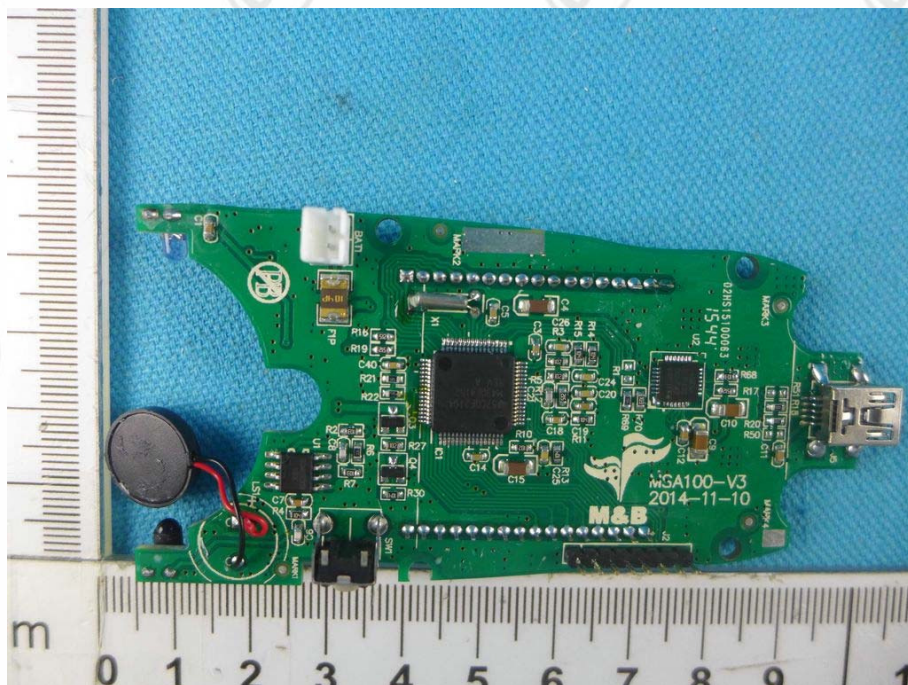
View of Product-11



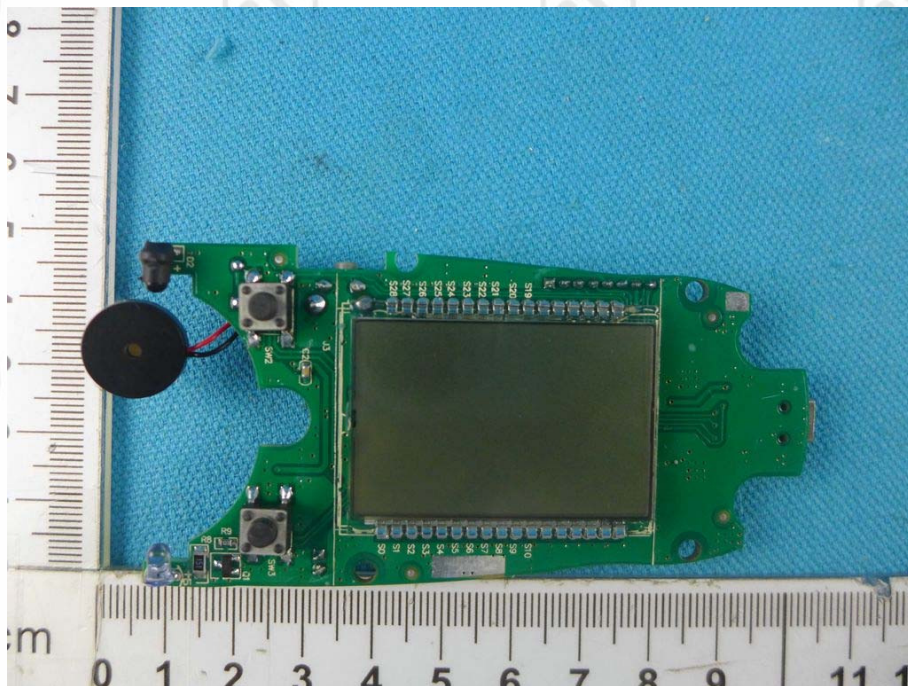
View of Product-12



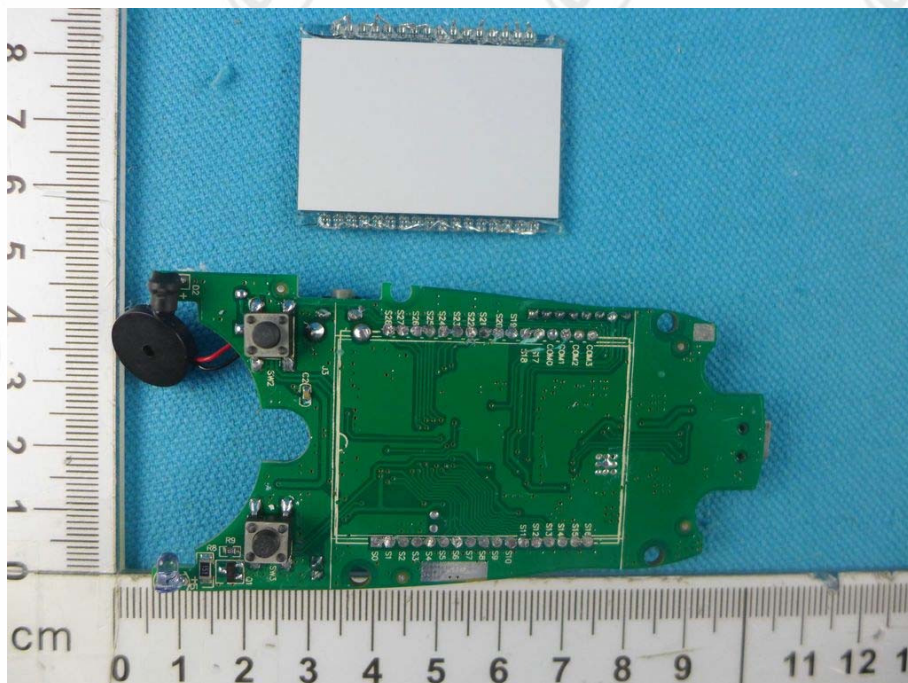
View of Product-13



View of Product-14



View of Product-15



View of Product-16

*** End of Report ***

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