EMC
Measurement and Test Report

For

Mid Ocean Brands B.V.

Unit 201 2F., Laford Centre, 838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, HongKong

Test Standards:	EN 55032:2015 EN 55024:2010+A1:2015
Product Description:	Spherical mini speaker
Tested Model:	MO8172
Report No.:	STR1788053E
Tested Date:	2017-03-21 to 2017-03-28
Issued Date:	2017-08-04
Tested By:	June Zheng / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager
Prepared By:	

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Mid Ocean Brands B.V.

Address of applicant: Unit 201 2F., Laford Center, 838 Lai Chi Kok Road, Cheung Sha Wan, Kowloon, HongKong

Manufacturer:

Address of manufacturer:

General Description of EUT	
Product Name:	Spherical mini speaker
Trade Name:	/
Model No.:	MO8172
Adding Model(s):	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Rated Voltage:	/
Rated Current:	/
Rated Power:	/
Power Adaptor Model:	/
Highest Internal Frequency:	Below 108MHz
Classification of Equipment:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Mid Ocean Brands B.V. in accordance with EN55032, Electromagnetic compatibility of multimedia equipment - Emission requirements and EN55024, Immunity characteristics Limits and methods of measurement.

The objective of the manufacturer is to demonstrate compliance with the standards EN55032 and EN55024 for multimedia equipment.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standards EN55032 and EN55024 for Information Technology Equipment, and all related testing and measurement techniques intentional standards.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test 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 and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Working	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Moble phone	HUAWEI	4X	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.6 Performance Criteria for EMS

All the test data has been collected, reduced, and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2016-06-04	2017-06-03
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-04	2017-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2016-06-04	2017-06-03
SEMT-1011	Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-04	2017-06-03
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-333	2016-06-04	2017-06-03
SEMT-1042	Horn Antenna	ETS	3117	00086197	2016-06-04	2017-06-03
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-04	2017-06-03
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2016-06-04	2017-06-03
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2016-06-04	2017-06-03
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2016-06-04	2017-06-03
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2016-06-04	2017-06-03
SEMT-1060	DC LISN	Schwarz beck	NNBM8126D	279	2016-06-04	2017-06-03
SEMT-1061	DC LISN	Schwarz beck	NNBM8126D	280	2016-06-04	2017-06-03
SEMT-1085	8-WIRE LISN	Schwarz beck	8158	CAT3-8158-0059	2016-06-04	2017-06-03
SEMT-1086	8-WIRE LISN	Schwarz beck	8158	CAT5-8158-0117	2016-06-04	2017-06-03
SEMT-1005	Clamp	Schwarz beck	MDS21	3809	2016-06-04	2017-06-03
SEMT-1014	Loop Antenna	EVERFINE	LLA-2	711001	2016-06-04	2017-06-03
SEMT-1071	VDH Test Head	AFJ	VDH 30	SC022Z	2016-06-04	2017-06-03
SEMT-1056	Digital Power Analyzer	California Instrument	CTS	72831	2016-06-04	2017-06-03
SEMT-1057	Power Source	California Instrument	5001IX-CTS-400	25965	2016-06-04	2017-06-03
SEMT-1027	ESD Generator	TESQ AG	NSG 437	161	2016-06-04	2017-06-03
SEMT-1055	Signal Generator	HP	8648A	3642U01277	2016-06-04	2017-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2016-06-04	2017-06-03
SEMT-1024	Transient 2000	EMC PARTNER	TRA2000	863	2016-06-04	2017-06-03
SEMT-1045	CS Immunity Tester	EMTEST	CWS500	0900-03	2016-06-04	2017-06-03

2. SUMMARY OF TESTRESULTS

Standards	Description of Test Item	Result
EN55032	Conducted Emission	N/A
	Radiated Emission	Compliant
EN61000-3-2	Harmonic Current Emission	N/A
EN61000-3-3	Voltage Fluctuation and Flicker	N/A
EN55024	Electrostatic Discharge Immunity in accordance with IEC 61000-4-2	Compliant
	Continuous Radiated Disturbances Immunity in accordance with IEC 61000-4-3	Compliant
	Electrical Fast Transient/Burst Immunity in accordance with IEC 61000-4-4	N/A
	Surges Immunity in accordance with IEC 61000-4-5	N/A
	Continuous Conducted Disturbances Immunity in accordance with IEC 61000-4-6	N/A
	Power-frequency Magnetic Fields Immunity in accordance with IEC 61000-4-8	N/A
	Voltage Dips/Interruptions Immunity in accordance with IEC 61000-4-11	N/A

N/A: not applicable

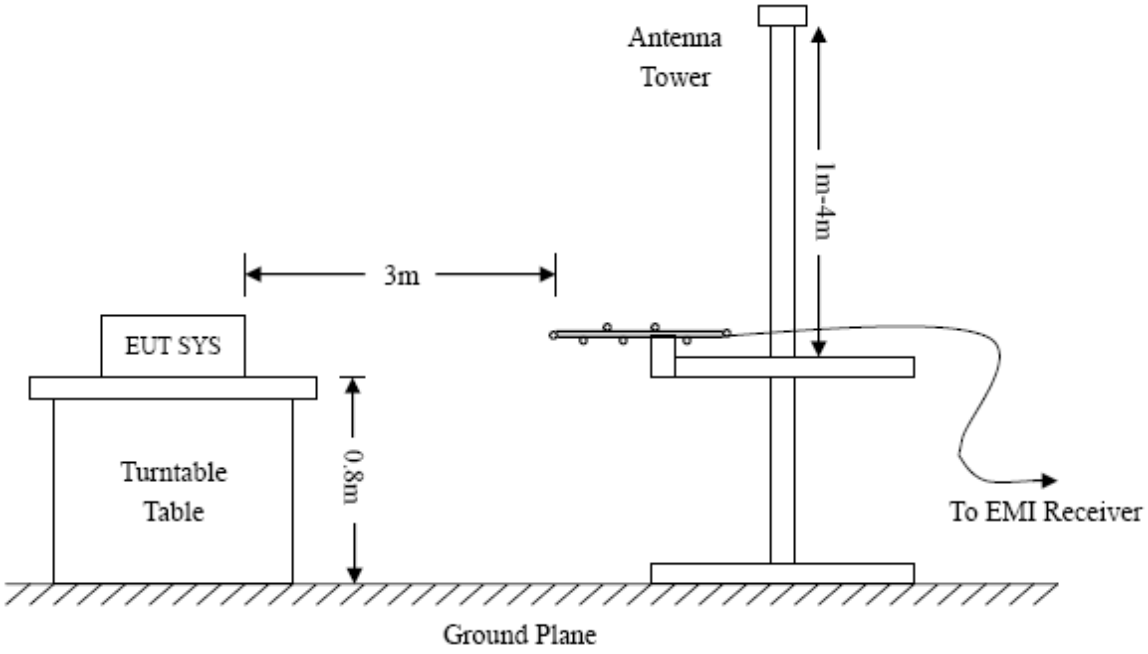
3. Radiated Emission

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

3.2 Test Procedure

Test is conducting under the description of EN55032 Annex A.3.4.



3.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B device. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – EN55032 Class B Limit

3.4 Environmental Conditions

Temperature:	23° C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

3.5 Summary of Test Results/Plots

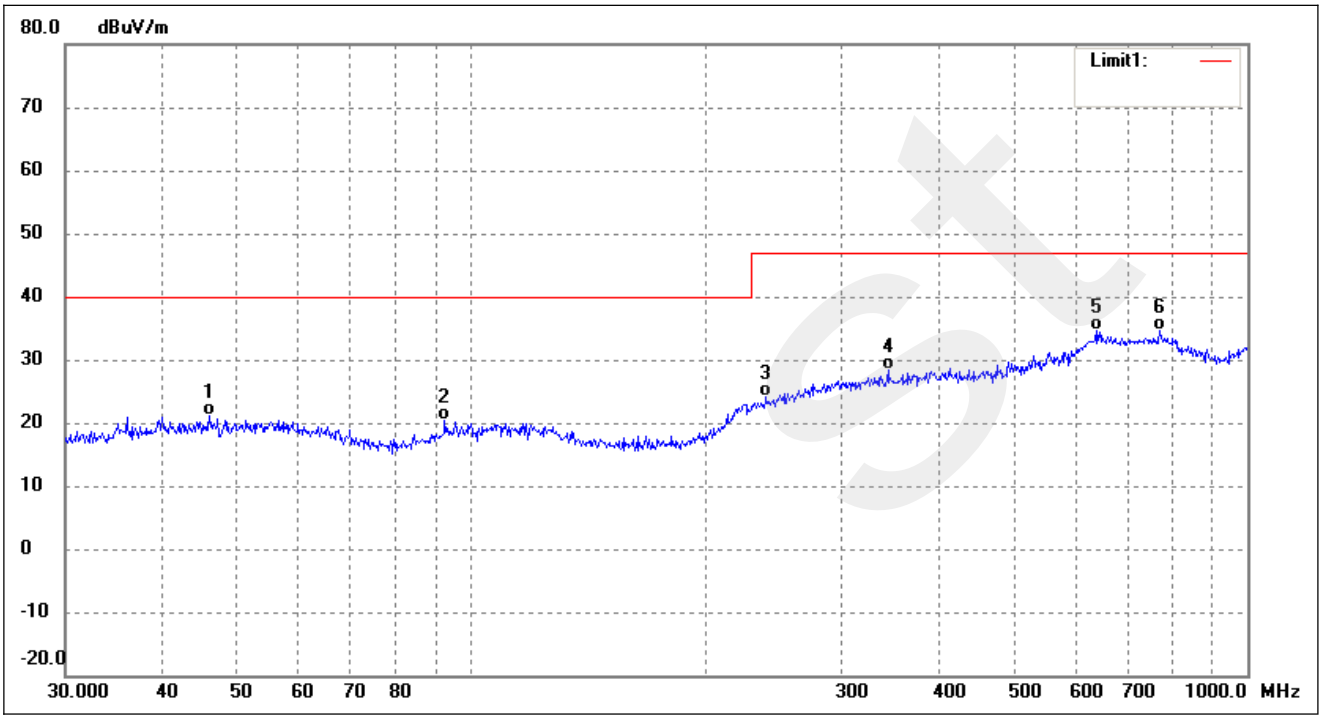
According to the data in section 3.5, the EUT complied with the EN55032 Class B standards, and had the worst margin is:

-12.27 dB at **771.4486 MHz** in the **Horizontal** polarization, **30 MHz to 1 GHz, 3Meters**

Plot of Radiated Emissions Test Data

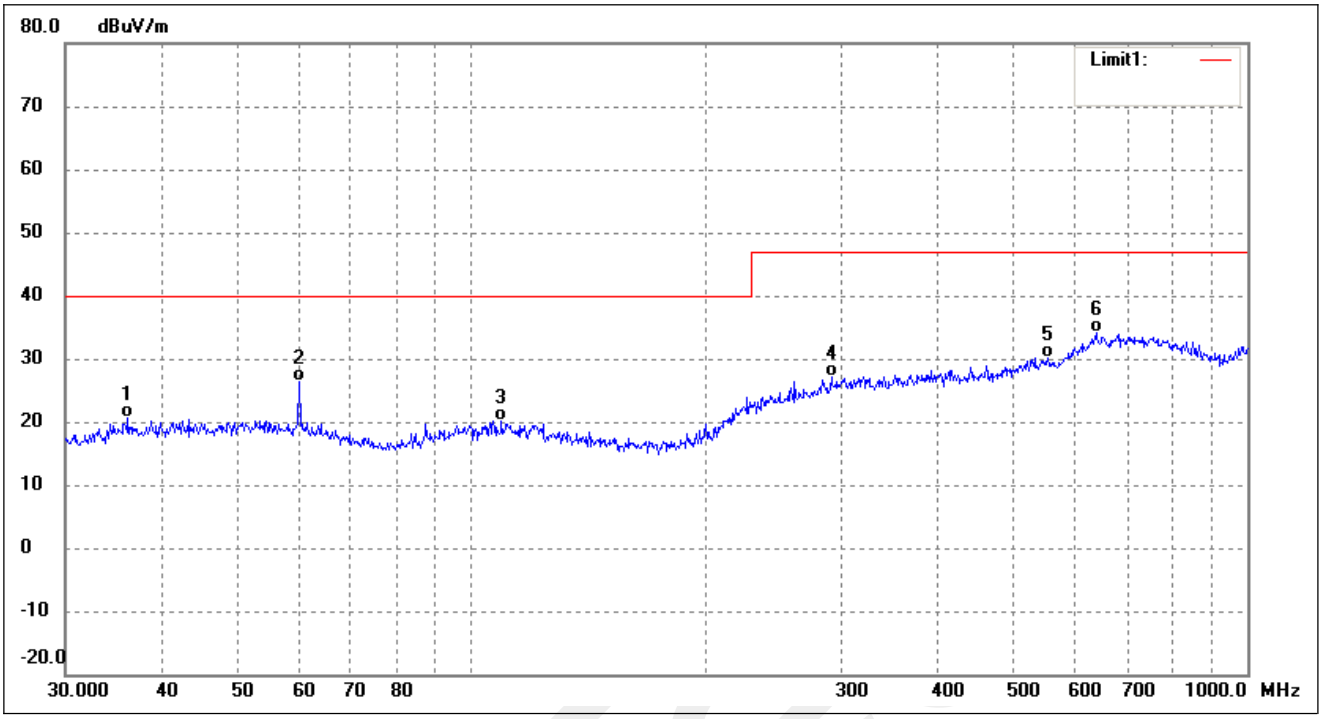
EUT: *Spherical mini speaker*
Tested Model: *MO8172*
Operating Condition: *TM1*
Comment: */*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	46.0164	16.11	4.96	21.07	40.00	-18.93	295	100	QP
2	92.4624	16.51	3.80	20.31	40.00	-19.69	275	100	QP
3	239.9874	15.12	8.93	24.05	47.00	-22.95	56	100	QP
4	344.3855	16.83	11.48	28.31	47.00	-18.69	223	100	QP
5	638.3686	16.50	18.01	34.51	47.00	-12.49	295	100	QP
6	771.4486	17.34	17.39	34.73	47.00	-12.27	241	100	QP

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	36.1272	16.16	4.35	20.51	40.00	-19.49	125	100	QP
2	60.0691	21.39	5.02	26.41	40.00	-13.59	157	100	QP
3	109.4116	15.28	4.87	20.15	40.00	-19.85	130	100	QP
4	291.0360	15.53	11.61	27.14	47.00	-19.86	115	100	QP
5	552.8833	16.19	13.95	30.14	47.00	-16.86	350	100	QP
6	638.3686	16.07	18.01	34.08	47.00	-12.92	250	100	QP

4. Electrostatic Discharges (ESD)

4.1 Test Procedure

Test is conducting under the description of IEC61000-4-2.

Test Performance

Performance Criterion: B

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

4.2 Electrostatic Discharge Immunity Test Data

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2	Test Levels (kV)									
Test Points	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Aux Port	A	A	A	A	A	A	A	A	/	/
Surface	A	A	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2	Test Levels (kV)									
Test Points	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Aux Port	A	A	A	A	/	/	/	/	/	/
Scrow	A	A	A	A	/	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

EN 61000-4-2	Test Levels (kV)									
Test Points	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Front Side	A	A	A	A	/	/	/	/	/	/
Top Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2	Test Levels (kV)									
Test Points	-2	+2	-4	+4	-6	+6	-8	+8	-15	+15
Front Side	A	A	A	A	/	/	/	/	/	/
Top Side	A	A	A	A	/	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/	/

Test Result: Pass

5. Continuous Radiated Disturbances (R/S)

5.1 Test Procedure

Test is conducting under the description of IEC61000-4-3.

Test Performance

Performance Criterion: A

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1010 mbar

5.2 Continuous Radiated Disturbances Test Data

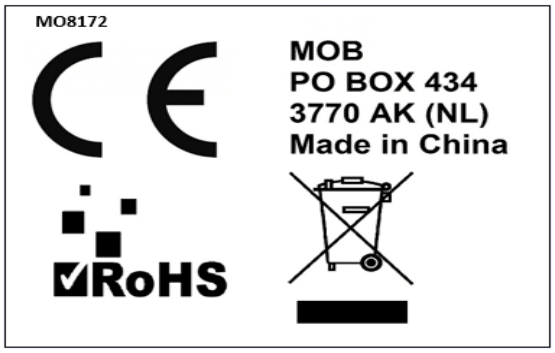
Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth

Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A

Test Result: Pass

EXHIBIT 1 - PRODUCT LABELING

Proposed CE Label Format



Specifications: Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The 'CE' marking must be affixed to the EUT or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents. The 'CE' marking is allowed less than 5 mm but must clear. If the 'CE' marking is reduced or enlarged the proportions given in the above graduated drawing must be respected. The Importer name, address and Manufacturer name and address should indicate on marking label or packaging or in a document accompanying

Proposed Label Location on EUT

CE Label Location

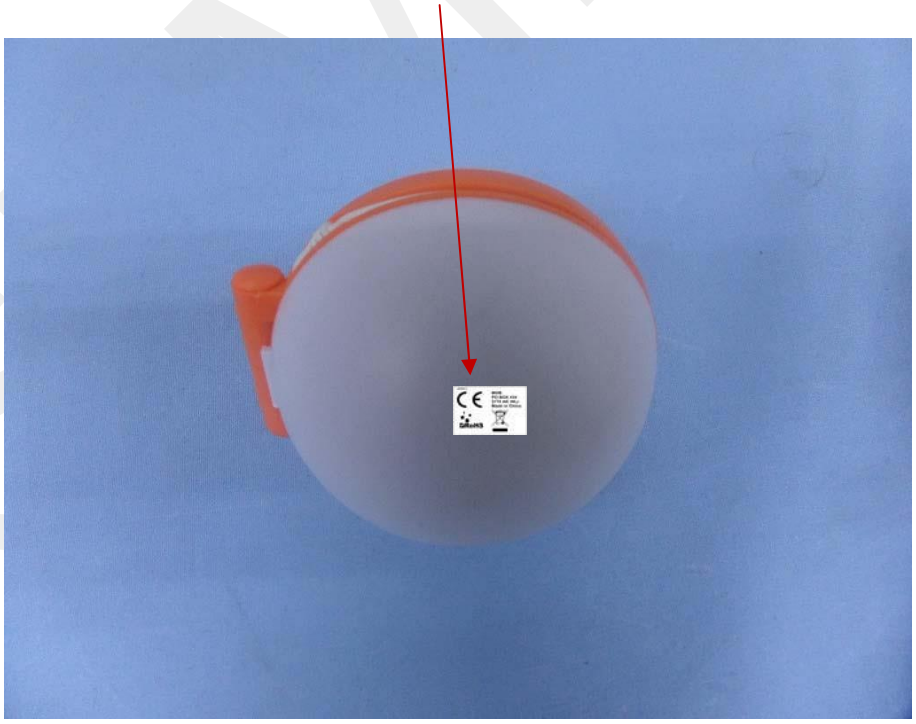
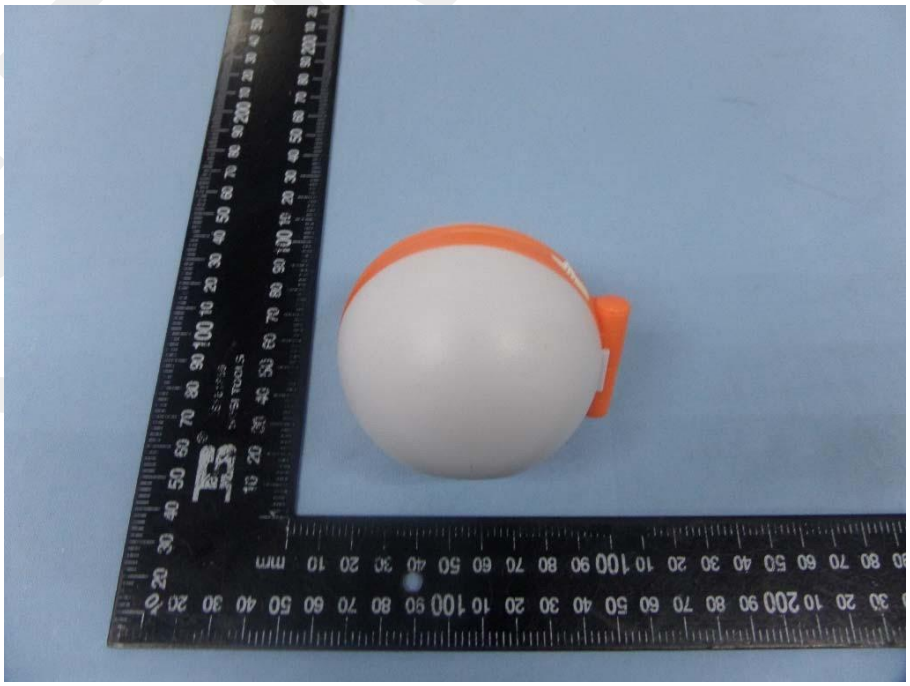


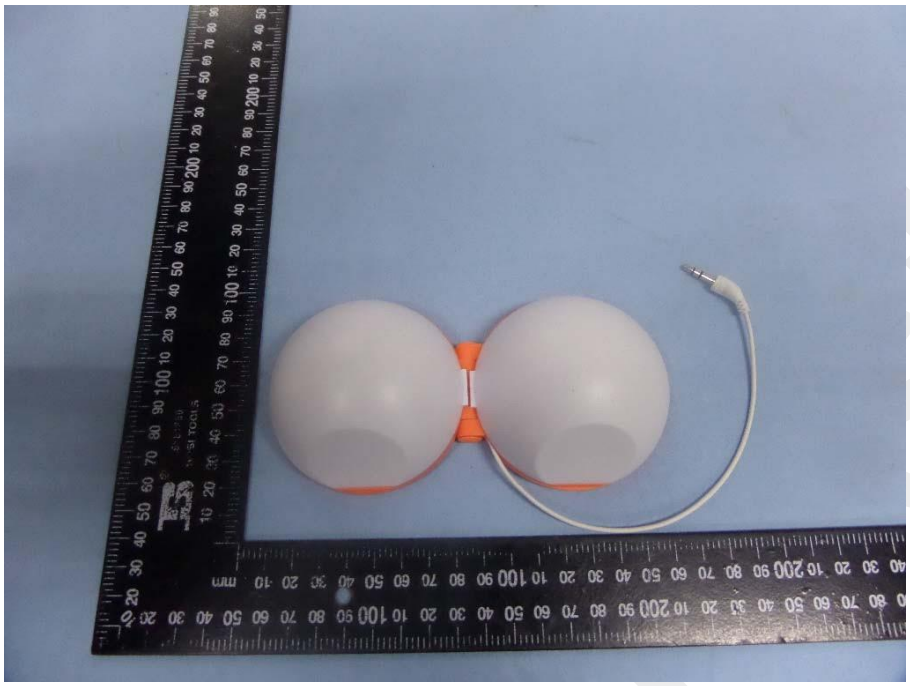
EXHIBIT 2 - EUT PHOTOGRAPHS

EUT View 1

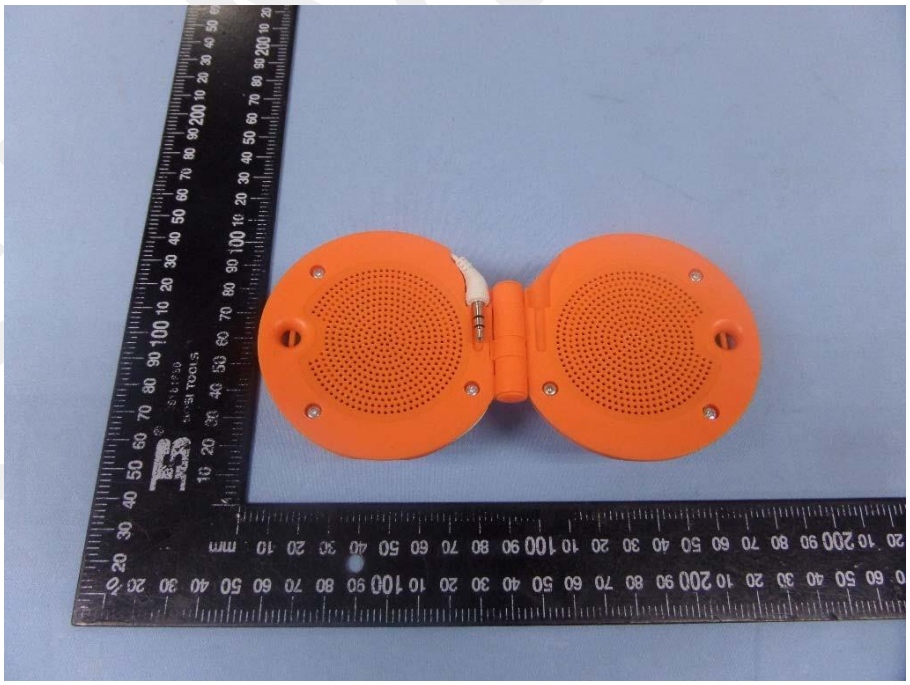
EUT View 2



EUT View 3



EUT View 4



EUT Housing and Board View 1

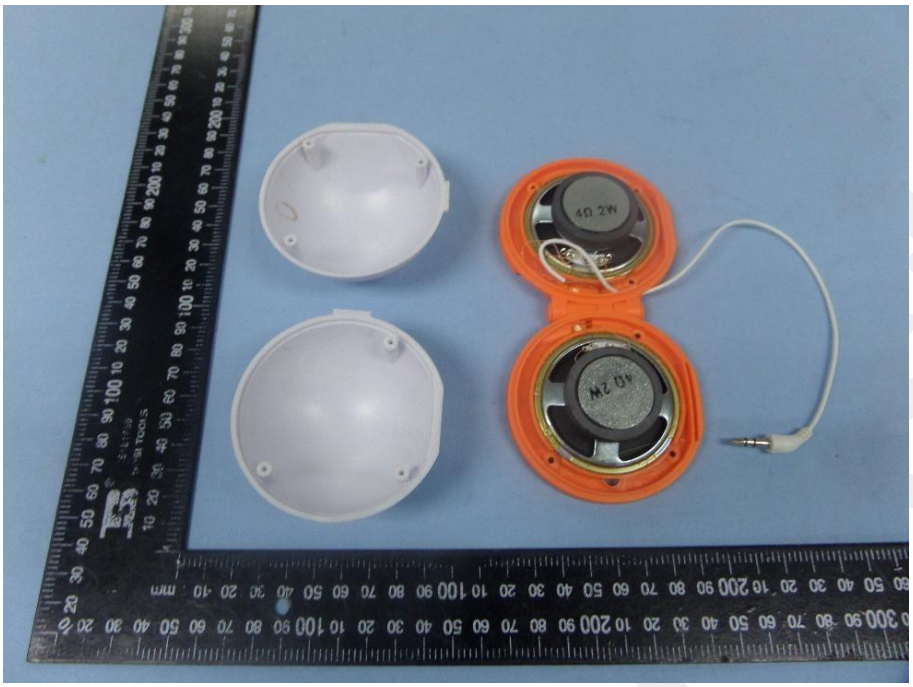
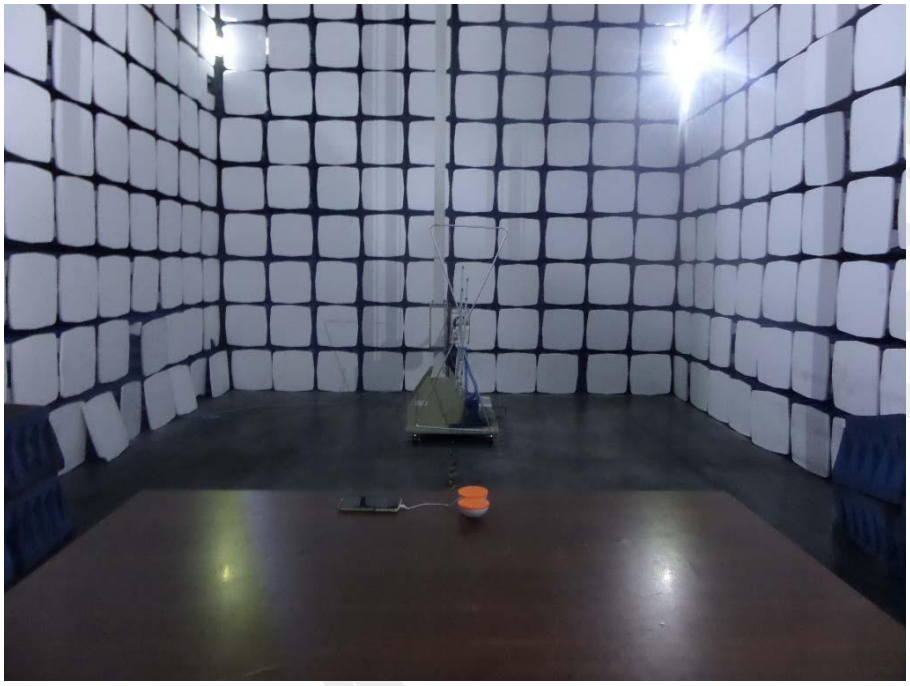
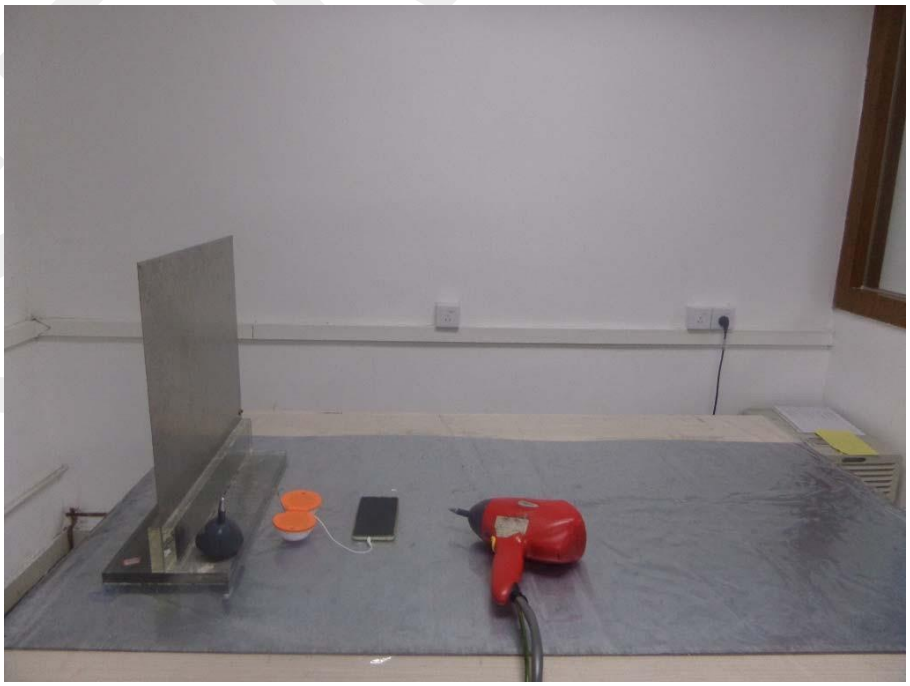


EXHIBIT 3 - TEST SETUP PHOTOGRAPHS

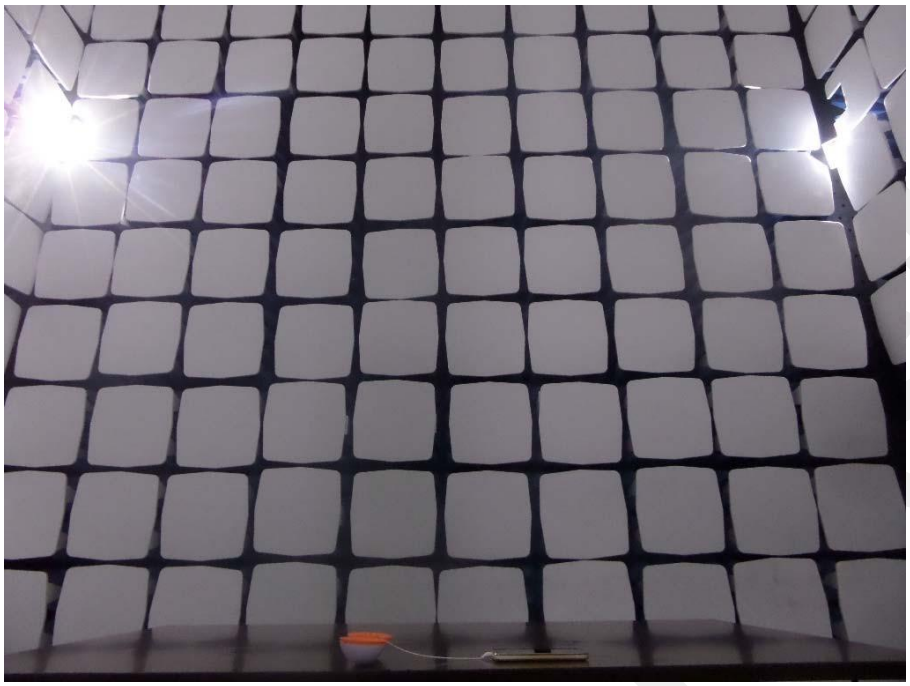
Radiation Emission Test View



IEC61000-4-2 Test View



IEC61000-4-3 Test View



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