

## EMC TEST REPORT

For

Keychain speaker

Model No.: P328.012, SL175

Prepared for :  
Address :

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Appendix I (Photos of EUT) (4 pages)

## TEST REPORT DESCRIPTION

Applicant :  
 Manufacturer :  
 EUT : Keychain speaker  
 Model No. : P328.012, SL175 (Note: These models are same except model number and appearance, here SL175 was selected for full test.)  
 Input Rating : DC 5V from adapter, 3.7V from battery

### Measurement Procedure Used:

EN 55032: 2015+AC: 2016

EN 61000-3-2: 2014, EN 61000-3-3: 2013

EN 55035: 2017

(IEC 61000-4-2: 2008, IEC 61000-4-3: 2006+A1: 2007+A2: 2010, IEC 61000-4-4: 2012,

IEC 61000-4-5: 2014, IEC 61000-4-6: 2013, IEC 61000-4-11: 2004)

The device described above is tested by EMTEK(DONGGUAN) CO., LTD. and EMTEK(SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK(DONGGUAN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the EN 55032, EN 61000-3-2, EN 61000-3-3 and EN 55035 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK(DONGGUAN) CO., LTD.

Date of Test : April 24, 2018 to April 25, 2018

*Aaron Tan*

Prepared by :

Aaron Tan/ Editor

*Tomas Yang*

Reviewer :

Tomas Yang/ Supervisor



Approved & Authorized Signer :

Sam Lv / Manager

## Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED180424001E

## 1. DESCRIPTION OF STANDARDS AND RESULTS

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted Disturbance at Mains Terminals	EN 55032: 2015+AC: 2016	Clause 5	Pass
Radiated Disturbance	EN 55032: 2015+AC: 2016	Clause 5	Pass
Harmonic Current Emissions	EN 61000-3-2: 2014	Class A	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013	Clause 5	Pass
IMMUNITY			
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
EFT/B Immunity	IEC 61000-4-4: 2012	B	Pass
Surge Immunity	IEC 61000-4-5: 2014	B	Pass
Conducted RF Immunity	IEC 61000-4-6: 2013	A	Pass
Power Frequency Magnetic Field	IEC 61000-4-8: 2009	A	N/A
Voltage Dips, >95% Reduction	IEC 61000-4-11: 2004	B	Pass
Voltage Dips, 30% Reduction		C	Pass
Voltage Interruptions		C	Pass
Broadband Repetitive Noise Impulses	EN 55035: 2017	A	N/A
Broadband Isolated Noise Impulses	EN 55035: 2017	B	N/A
Note: N/A is an abbreviation for Not Applicable.			

## 2. GENERAL INFORMATION

### 2.1 Description of Device (EUT)

EUT	: Keychain speaker
Model Number	: P328.012, SL175
Trade Mark	: N/A
Power Supply for Test	: DC 5V from adapter, 3.7V from battery
Operating Mode	: Charging
Applicant	:
Address	:
Manufacturer	:
Address	:
Date of sample receiver	: April 24, 2018
Date of Test	: April 24, 2018 to April 25, 2018



## 2.2 Description of Support Device

Audio Signal Generator : Manufacturer: TRONSON ELECTRONICS  
COMPANY LIMITED  
M/N: TAG-101  
S/N: Tr061791  
CE

USB Flash Disk : Manufacturer: Kingston  
M/N: DTIG2/2GB  
S/N: 79E35A1E-8131F37  
FCC,CE

## 2.3 Description of Test Facility

### Site Description

EMC Lab : Accredited by CNAS, 2015.09.24  
The certificate is valid until 2018.07.03  
The Laboratory has been assessed and proved to be in  
compliance with CNAS/CL01:2006  
The Certificate Registration Number is L3150

Registered on Industry Canada, January 13, 2017  
The Certificate Number is 9444A.

Name of Firm : EMTEK(DONGGUAN) CO., LTD.  
Site Location : No.281, Guantai Road, Nancheng District, Dongguan,  
Guangdong, China.

## 2.4 Measurement Uncertainty

Test Item	Uncertainty
Conducted Emission Uncertainty	: 2.42dB
Radiated Emission Uncertainty (3m Chamber)	: 3.34dB (30M~1GHz Polarize: H) 3.32dB (30M~1GHz Polarize: V)
Uncertainty for Flicker test	: 0.07%
Uncertainty for Harmonic test	: 1.8%
Uncertainty for C/S Test	: 1.45(Using CDN Test) 2.37(Using EM Clamp Test)
Uncertainty for R/S Test	: 2.10dB(80MHz-200MHz) 1.76dB(200MHz-1000MHz)
Uncertainty for test site temperature and humidity	: 0.6℃ 4%

### 3. MEASURING DEVICES AND TEST EQUIPMENT

#### 3.1 For Power Line Conducted Emission

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde&Schwarz	ESCS30	100018	May 16, 2017	1 Year
2.	L.I.S.N.	Rohde&Schwarz	ENV216	100017	May 16, 2017	1 Year
3.	RF Switching Unit	CDS	RSU-M2	38401	May 16, 2017	1 Year

#### 3.2 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	May 16, 2017	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	May 16, 2017	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	May 16, 2017	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	May 16, 2017	1 Year
5.	Color CD+G Karaoke Machine with Dancing Water LED Light Show and Bluetooth	SUNSP0	SP-140A	N/A	May 16, 2017	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	May 16, 2017	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	May 16, 2017	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	May 16, 2017	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	May 16, 2017	1 Year
10.	Cable	Schwarzbeck	PLF-100	519489	May 16, 2017	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	May 16, 2017	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	May 16, 2017	1 Year

#### 3.3 For Harmonic / Flicker Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	EMTEST	DPA500	U0526100506	May 16, 2017	1 Year
2.	AC Frequency Conversion Power	EMTEST	ACS 500	V526100507	May 16, 2017	1 Year
3.	PC	LENOVO	T2900D	SS12485803	May 16, 2017	1 Year

#### 3.4 For Electrostatic Discharge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQAG	NSG437	EE166	May 16, 2017	1 Year

### 3.5 For RF Strength Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 16, 2017	1 Year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 16, 2017	1 Year
3.	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120 L3F	332	May 16, 2017	1 Year
4.	Power Amplifier	PRANA	AP32MT215	N/A	May 16, 2017	1 Year
5.	Power Amplifier	MILMEGA	AS0102-55	N/A	May 16, 2017	1 Year
6.	Signal Generator	AEROFLEX	2023B	N/A	May 16, 2017	1 Year
7.	Field Strength Meter	HOLADAY	HI-6005	N/A	May 16, 2017	1 Year
8.	RS232 Fiber Optic Modem	HOLADAY	HI-4413P	N/A	May 16, 2017	1 Year
9.	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	N/A	May 16, 2017	1 Year

### 3.6 For Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS500M6B	V0526100502	May 16, 2017	1 Year
2.	Coupling Clamp	EM TEST	HFK	0605-10	May 16, 2017	1 Year

### 3.7 For Surge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	EM TEST	VCS 500M6T	V0526100503	May 16, 2017	1 Year

### 3.8 For Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Simulator	EM TEST	CWS500C	0900-12	May 17, 2017	1Year
2.	CDN	EM TEST	CDN-M2	5100100100	May 17, 2017	1 Year
3.	CDN	EM TEST	CDN-M3	0900-11	May 17, 2017	1 Year
4.	Injection Clamp	EM TEST	F-2031-23MM	368	May 17, 2017	1 Year
5.	Attenuator	EM TEST	ATT6	0010222A	May 17, 2017	1 Year

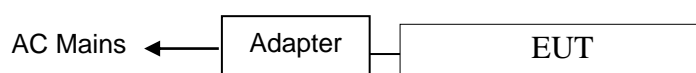
### 3.9 For Voltage Dips and Interruptions Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 17, 2017	1 Year
2.	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 17, 2017	1 Year
3.	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	N/A	N/A
4.	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	N/A	N/A
5.	Proflin 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	N/A	N/A

## 4. POWER LINE CONDUCTED MEASUREMENT

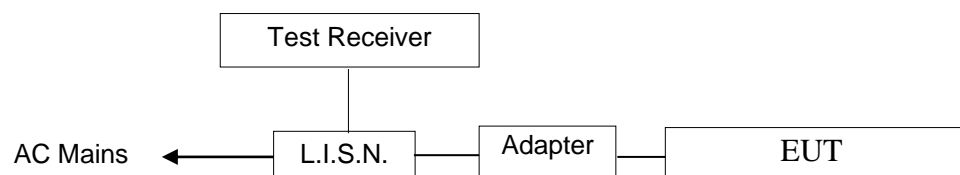
### 4.1 Block Diagram of Test Setup

#### 4.1.1 Block diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 4.1.2 Block diagram of test setup



(EUT: Keychain speaker)

### 4.2 Conducted Power Line Emission Measurement Standard and Limits

#### 4.2.1 Standard: EN 55032: 2015+AC: 2016

#### 4.2.2 Limits

Frequency	At mains terminals (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150KHz ~ 0.5MHz	66 ~ 56*	56 ~ 46*
0.5MHz ~ 5MHz	56	46
5.0MHz ~ 30MHz	60	50

1. At the transition frequency the lower limit applies.
2. \* decreasing linearly with logarithm of the frequency.

### 4.3 EUT Configuration on Measurement

The configuration of the EUT is same as Section 2.1.

#### 4.4 Operating Condition of EUT

4.4.1 Setup the EUT as shown in Section 4.1.

4.4.2 Turn on the power of all equipments.

4.4.3 Let the EUT work in measuring mode (Charging) and measure it.

#### 4.5 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 55032 standard.

The bandwidth of the test receiver (ESCS30) is set at 200Hz in 9K~150KHz range and 9KHz in 150K~30MHz range.

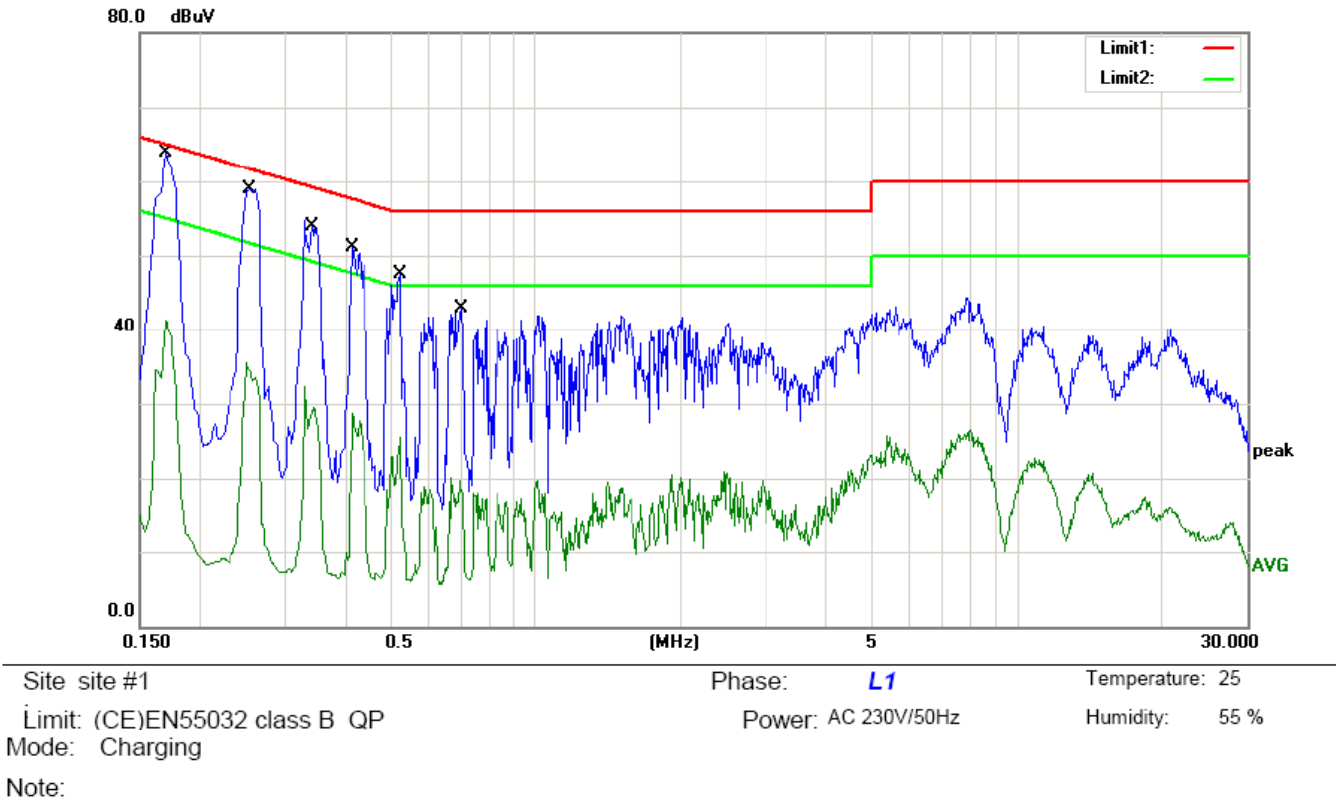
The frequency range from 150KHz to 30MHz is checked.

#### 4.6 Measurement Results

**PASS.**

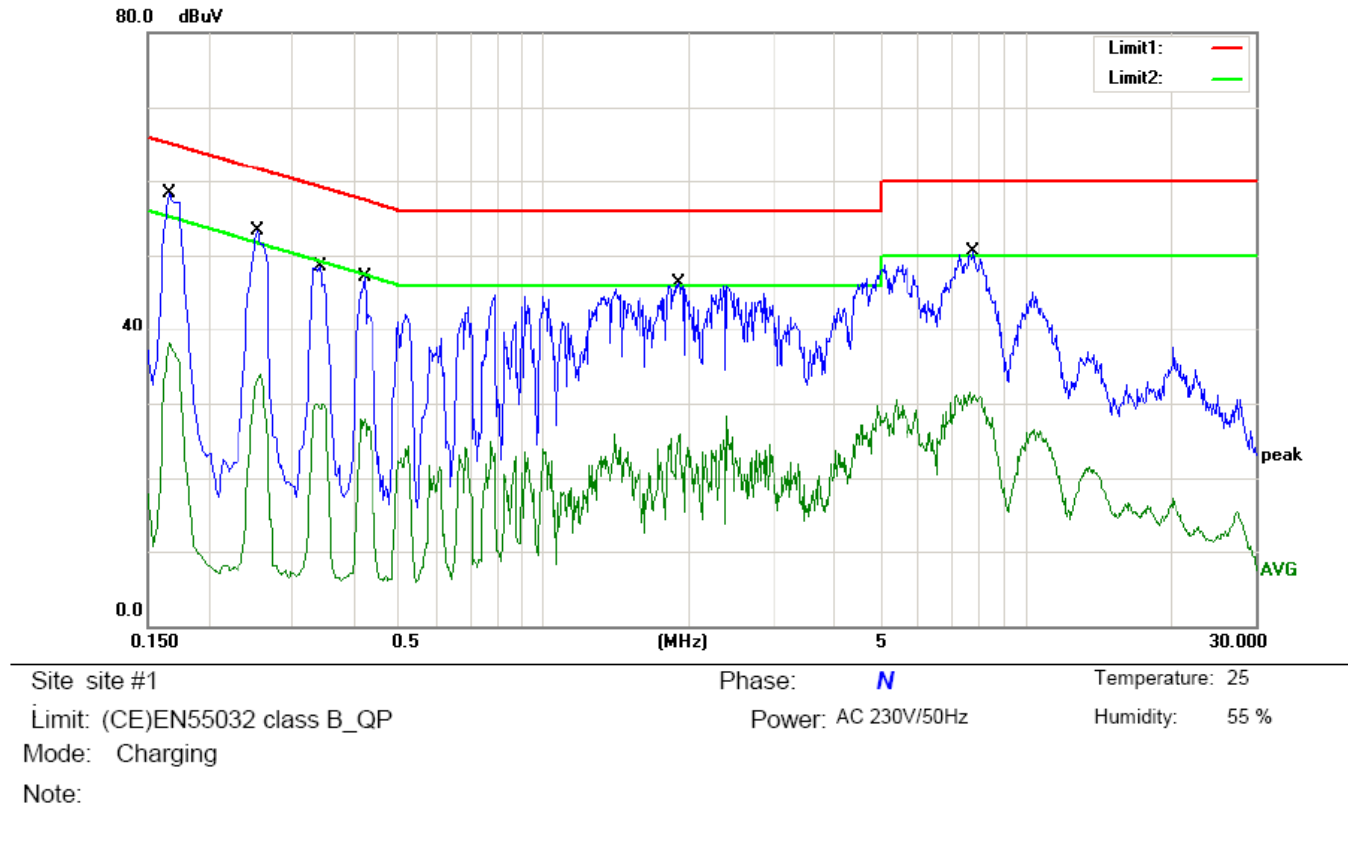
The frequency range from 150KHz to 30MHz is investigated.

The scanning waveforms of worst test mode (Charging) in below a few pages.



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1700	47.32	9.78	57.10	64.96	-7.86	QP	
2		0.1700	31.49	9.78	41.27	54.96	-13.69	AVG	
3		0.2540	41.40	9.80	51.20	61.63	-10.43	QP	
4		0.2540	25.63	9.80	35.43	51.63	-16.20	AVG	
5		0.3420	40.49	9.81	50.30	59.15	-8.85	QP	
6		0.3420	17.39	9.81	27.20	49.15	-21.95	AVG	
7		0.4140	36.67	9.83	46.50	57.57	-11.07	QP	
8		0.4140	16.86	9.83	26.69	47.57	-20.88	AVG	
9		0.5220	33.96	9.84	43.80	56.00	-12.20	QP	
10		0.5220	13.37	9.84	23.21	46.00	-22.79	AVG	
11		0.6980	28.76	9.84	38.60	56.00	-17.40	QP	
12		0.6980	8.30	9.84	18.14	46.00	-27.86	AVG	

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: Washington



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1660	44.32	9.78	54.10	65.16	-11.06	QP	
2		0.1660	28.31	9.78	38.09	55.16	-17.07	AVG	
3		0.2540	40.40	9.80	50.20	61.63	-11.43	QP	
4		0.2540	22.82	9.80	32.62	51.63	-19.01	AVG	
5		0.3420	35.49	9.81	45.30	59.15	-13.85	QP	
6		0.3420	20.10	9.81	29.91	49.15	-19.24	AVG	
7		0.4220	33.77	9.83	43.60	57.41	-13.81	QP	
8		0.4220	17.98	9.83	27.81	47.41	-19.60	AVG	
9		1.8980	33.36	9.84	43.20	56.00	-12.80	QP	
10		1.8980	15.77	9.84	25.61	46.00	-20.39	AVG	
11		7.7860	36.58	9.92	46.50	60.00	-13.50	QP	
12		7.7860	20.88	9.92	30.80	50.00	-19.20	AVG	

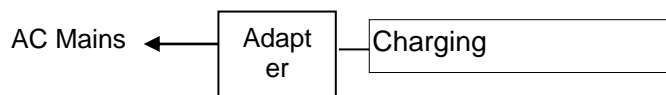
\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: Washington



## 5. RADIATED EMISSION MEASUREMENT

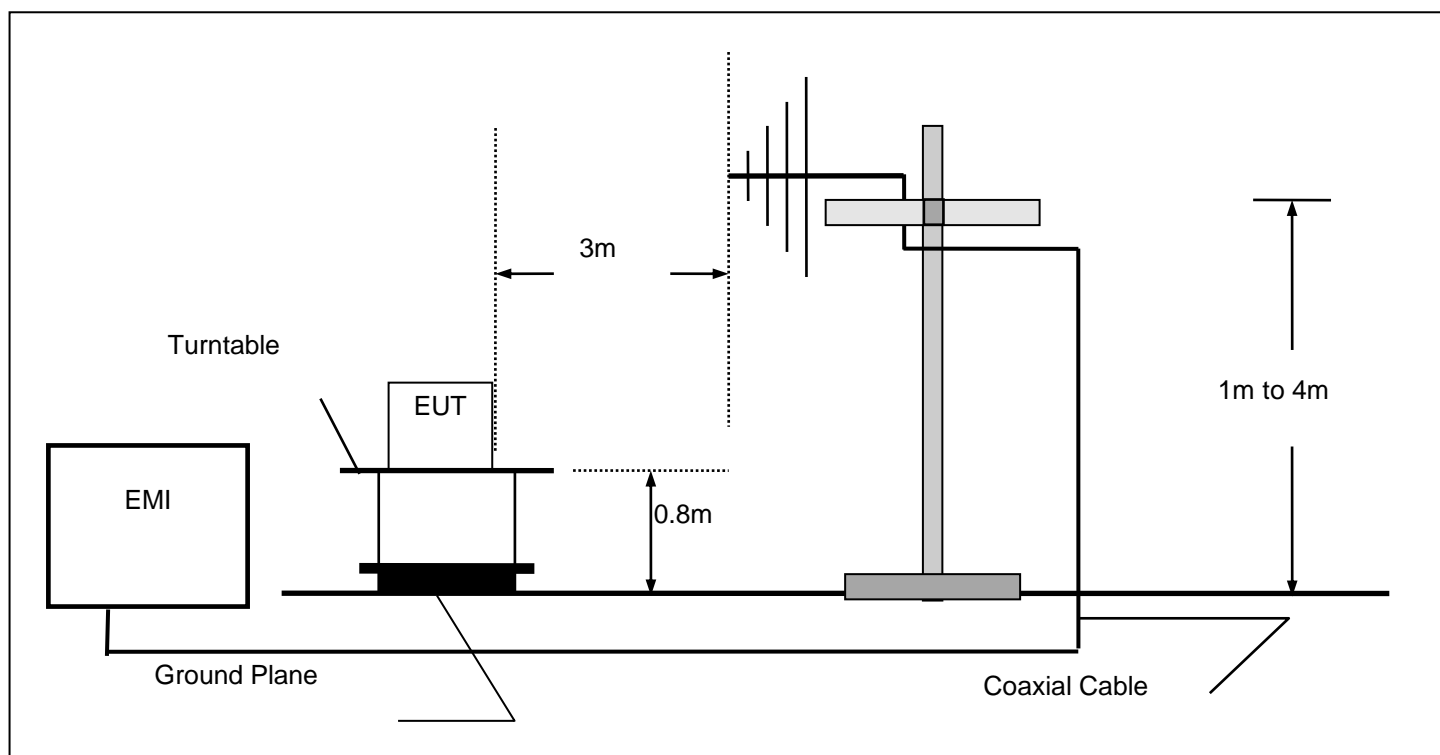
### 5.1 Block Diagram of Test

#### 5.1.1 Block diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 5.1.2 Block diagram of test setup (In chamber)



(EUT: Keychain speaker)

### 5.2 Measuring Standard

EN 55032: 2015+AC: 2016

### 5.3 Radiated Emission Limits

All emanations from a device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:  
Limits 6 GHz

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47
1000~3000	3	70
3000~6000	3	74

- Note: (1) The smaller limit shall apply at the combination point between two frequency bands.  
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

### 5.4 EUT Configuration on Test

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

EUT : Keychain speaker  
Model Number : SL175

### 5.5 Operating Condition of EUT

5.5.1 Turn on the power.

5.5.2 Let the EUT work in test mode (Charging) and measure it.

### 5.6 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn 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 which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarizations of the antenna are set on test.

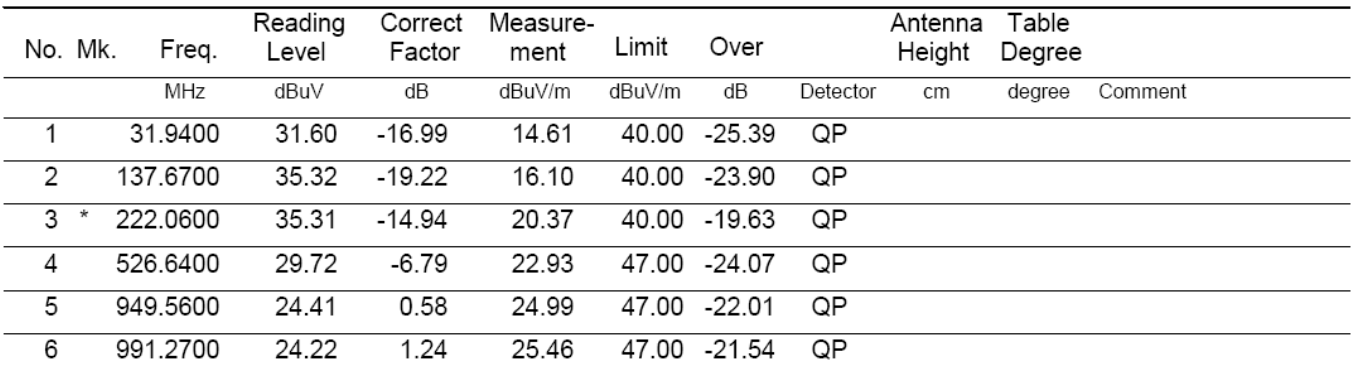
The bandwidth of the Receiver (ESCI) is set at 120kHz.

### 5.7 Test Results

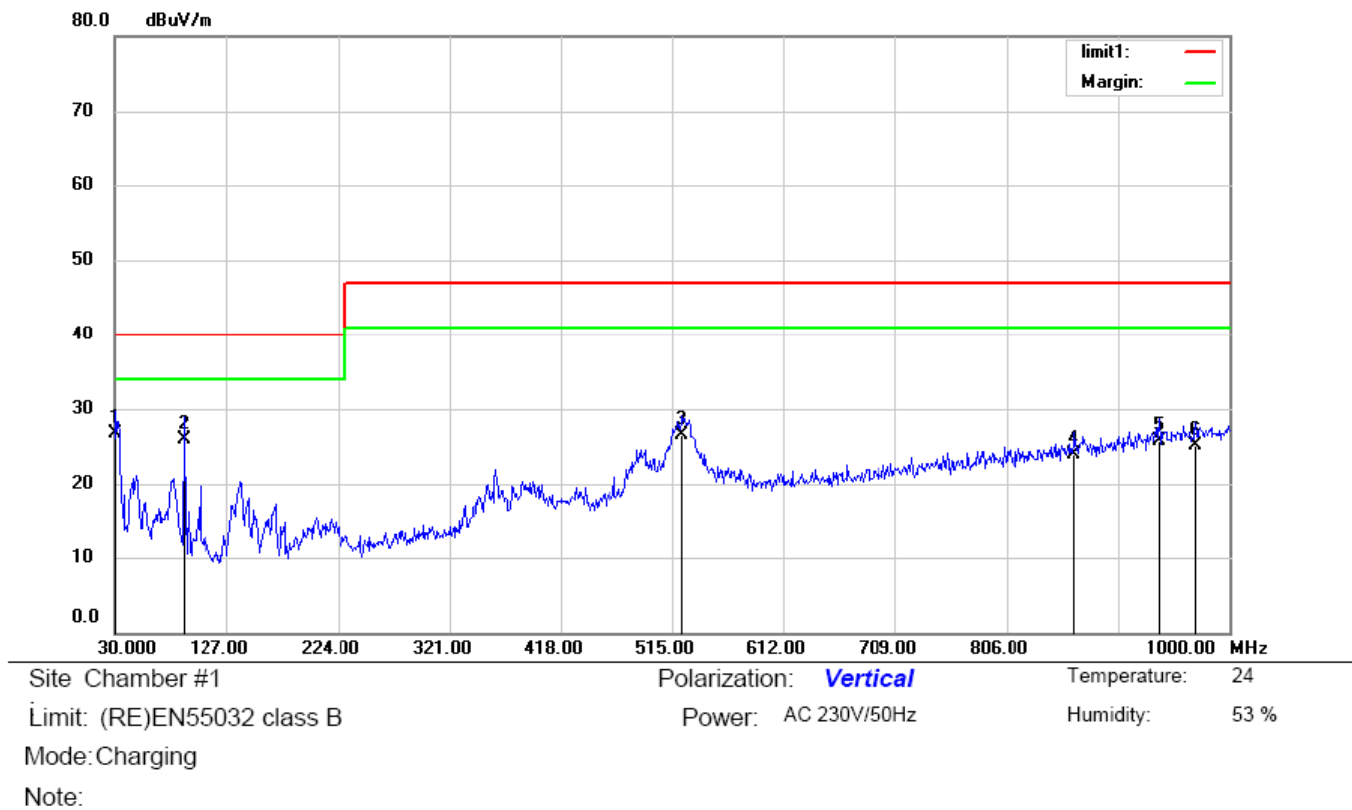
**PASS.**

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

The scanning waveforms of the worst test mode (Charging) in below a few pages.



Operator: KK



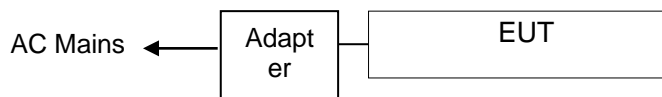
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	30.9700	43.73	-16.95	26.78	40.00	-13.22	QP		
2		90.1400	43.56	-17.72	25.84	40.00	-14.16	QP		
3		523.7300	33.46	-6.93	26.53	47.00	-20.47	QP		
4		865.1700	24.81	-0.86	23.95	47.00	-23.05	QP		
5		939.8600	25.25	0.52	25.77	47.00	-21.23	QP		
6		970.9000	24.17	0.92	25.09	47.00	-21.91	QP		

\*:Maximum data    x:Over limit    !:over margin    Operator: KK

## 6. HARMONIC CURRENT MEASUREMENT

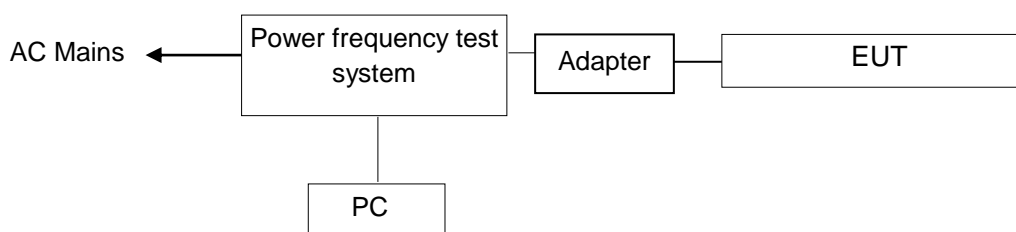
### 6.1 Block Diagram of Test Setup

#### 6.1.1 Block diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 6.1.2 Block Diagram of Harmonic Test Setup



(EUT: Keychain speaker)

### 6.2 Measuring Standard

EN 61000-3-2: 2014    Class D    Power ≤ 75W

### 6.3 Operating Condition of EUT

Same as Section 4.4 except that the test setup replaced by Section 6.1.

### 6.4 Test Results

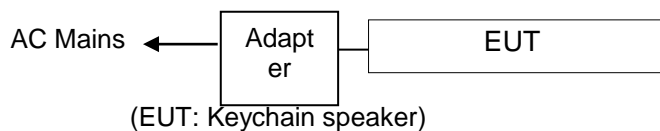
Not Applicable.

Because power of EUT is less than 75W, according to standard EN61000-3-2, Harmonics Current is not required.

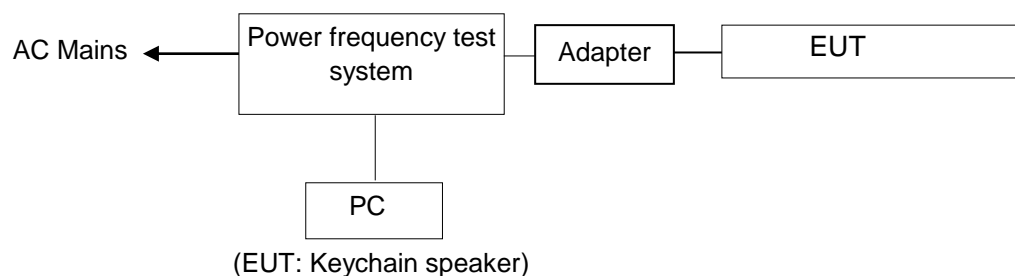
## 7. VOLTAGE FLUCTUATIONS & FLICKER MEASUREMENT

### 7.1 Block Diagram of Test Setup

#### 7.1.1 Block diagram of connection between the EUT and simulators



#### 7.1.2 Block Diagram of Flicker Test Setup



### 7.2 Measuring Standard

EN 61000-3-3: 2013

### 7.3 Operating Condition of EUT

Same as Section 4.4 except that the test setup replaced by Section 7.1.

### 7.4 Test Results

**PASS.**

Please refer to the following pages.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Keychain speaker

Test category: All parameters (European limits)

Test date: 2018/04/24

Test duration (min): 10

Comment: Charging

Customer: Ningbo Cstar Imp & Exp CO., LTD

Test Result: Pass

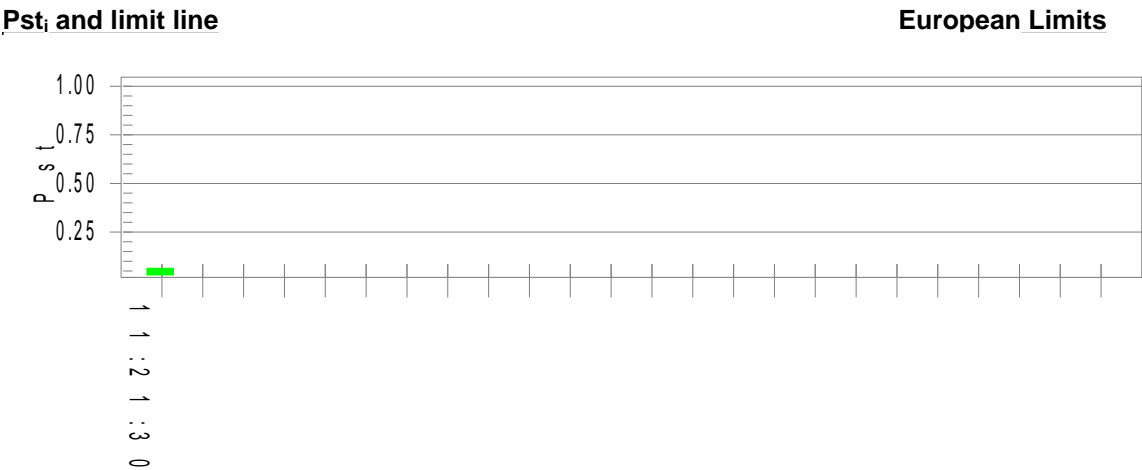
Tested by: Lin

Test Margin: 100

End time: 11:21:30

Data file name: SL175.cts\_data

Status: Test Completed

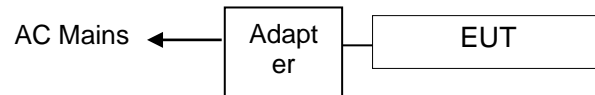


Parameter values recorded during the test:				
Vrms at the end of test (Volt):	230.09			
Highest dt (%):	0.00	Test limit (%):	N/A	N/A
T-max (mS):	0.0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	-0.04	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

## 8. ELECTROSTATIC DISCHARGE TEST

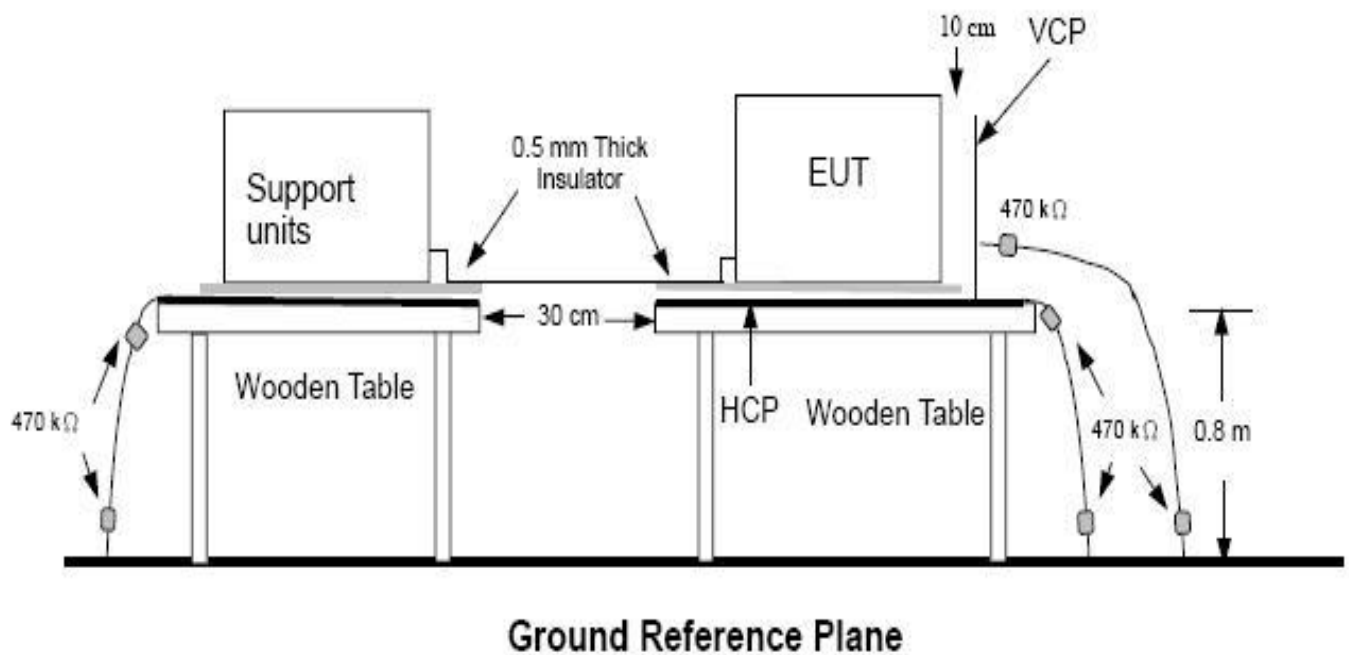
### 8.1 Block Diagram of Test Setup

#### 8.1.1 Block diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 8.1.2 Block Diagram of ESD Test Setup



(EUT: Keychain speaker)

### 8.2 Test Standard

EN 55035: 2017

(IEC 61000-4-2: 2008 (Severity Level: 2 /Contact Discharge:  $\pm 4\text{KV}$   
Severity Level: 3 / Air Discharge:  $\pm 8\text{KV}$ ))



## 8.3 Severity Levels and Performance Criterion

### 8.3.1 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

### 8.3.2 Performance criterion: **B**

## 8.4 EUT Configuration

The configuration of EUT is listed in Section 2.1

## 8.5 Operating Condition of EUT

8.5.1 Setup the EUT as shown in Section 8.1.

8.5.2 Turn on the power of all equipments.

8.5.3 Let the EUT work in test mode (Charging) and measure it.

## 8.6 Test Procedure

### 8.6.1 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 25 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

### 8.6.2 Contact Discharge:

All the procedure shall be same as Section 8.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

### 8.6.3 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 positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

### 8.6.4 Indirect discharge for vertical coupling plane:

At least 20 single discharge 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.

## 8.7 Test Results

**PASS.**

Please refer to the following page.

## Electrostatic Discharge Test Results

EMTEK(DONGGUAN) CO., LTD

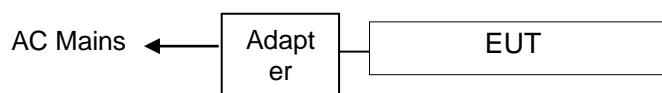
Applicant : _____ EUT : Keychain speaker M/N : SL175 Power Supply : AC 230V/50Hz Test Mode : Charging	Test Date : April 25, 2018 Temperature : 24℃ Humidity : 55% Test Engineer : Ye Criterion : B	
Air Discharge: ±2, 4, 8KV Contact Discharge: ±2, 4KV # For each point positive 25 times and negative 25 times		
Location	Kind A-Air Discharge C-Contact Discharge	Result
I/O Port 1 points	A	PASS
Gap 5 points	A	PASS
Switch 1 points	A, C	PASS
	A	PASS
HCP	C	PASS
VCP	C	PASS
Remark :	Test Equipment : ESD Tester (TESEQ AG, NSG437)	

Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

## 9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

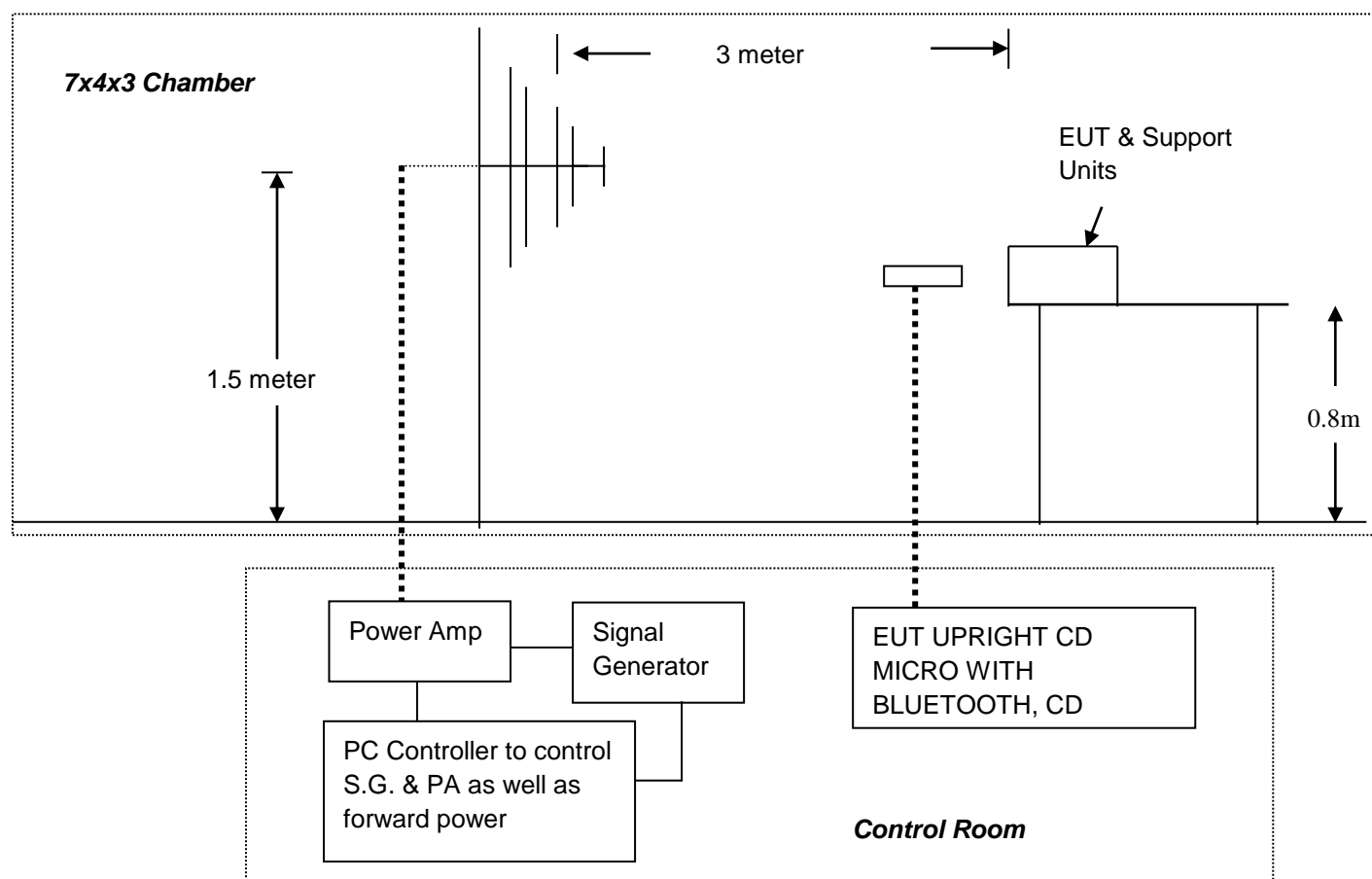
### 9.1 Block Diagram of Test Setup

#### 9.1.1 Block diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 9.1.2 Block diagram of R/S test set up



(EUT: Keychain speaker)

### 9.2 Test Standard

EN 55035: 2017

(IEC 61000-4-3: 2006+A1: 2007+A2: 2010 (Severity Level 2, 3V / m))

### 9.3 Severity Levels and Performance Criterion

#### 9.3.1 Severity level

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

#### 9.3.2 Performance criterion: **A**

### 9.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

### 9.5 Operating Condition of EUT

9.5.1 Setup the EUT as shown in Section 9.1.

9.5.2 Turn on the power of all equipments.

9.5.3 Let the EUT work in test mode (Charging) and measure it.

### 9.6 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which 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 EUT screen. All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80 - 1000 MHz, 1800MHz, 2600MHz 3500MHz, 5000MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

### 9.7 Test Results

**PASS.**

These test result outsourced to EMTEK(SHENZHEN) CO., LTD.  
Please refer to the following page.

# RF Field Strength Susceptibility Test Results

EMTEK(SHENZHEN) CO., LTD.

Applicant: _____		Test Date : <u>April 25, 2018</u>
EUT : <u>Keychain speaker</u>		Temperature : <u>24°C</u>
M/N : <u>SL175</u>		Humidity : <u>55%</u>
Field Strength: <u>3 V/m</u>		Criterion: <u>A</u>
Power Supply: <u>AC 230V/50Hz</u>		
Frequency Range: <u>80 - 1000MH,1800MHz, 2600MHz, 3500MHz, 5000MHz</u>		
Test Engineer: <u>Lin</u>		
Modulation: <input checked="" type="checkbox"/> AM <input type="checkbox"/> Pulse <input type="checkbox"/> none 1 KHz 80%		
Test Mode : <u>Charging</u>		

	Frequency Range : 80 - 1000MH,1800MHz, 2600MHz, 3500MHz, 5000MHz	
Steps	1 %	
	Horizontal	Vertical
Front	PASS	PASS
Right	PASS	PASS
Rear	PASS	PASS
Left	PASS	PASS

**Test Equipment :**

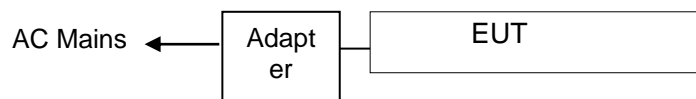
1. Signal Generator : 2023B (AEROFLEX)
2. Power Amplifier : AS0102-55 (MILMEGA)& AP32MT215 (PRANA)
3. Log.-Per. Antenna: VULP 9118E(SCHWARZBECK)
4. Broad-Band Horn Antenna: BBHA9120L3F (SCHWARZBECK)
5. RF Power Meter. Dual Channel : 4232A (BOONTON)
6. Field Strength Meter: HI-6005(HOLADAY)

Note:

## 10. ELECTRICAL FAST TRANSIENT/BURST TEST

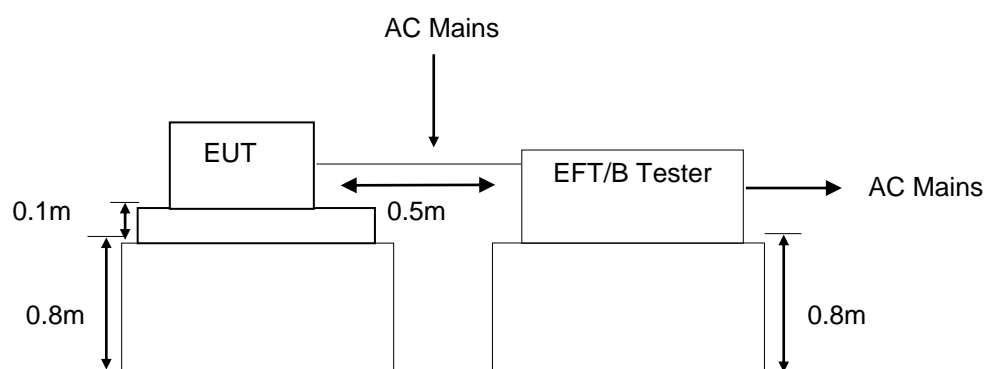
### 10.1 Block Diagram of Test Setup

#### 10.1.1 Block Diagram of connection between the EUT and simulators



(EUT: Keychain speaker)

#### 10.1.2 Block Diagram of EFT Test Setup



(EUT:Keychain speaker)

### 10.2 Test Standard

EN 55035: 2017

(IEC 61000-4-4: 2012, Severity Level, Level 2: 1KV; Line to earth: Level 1, 0.5KV)

## 10.3 Severity Levels and Performance Criterion

### 10.3.1 Severity level

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O (Input/Output) Signal data and control ports	
	Voltage peak KV	Repetition rate KHz	Voltage peak KV	Repetition rate KHz
1.	0.5 KV	5 or 100	0.25 KV	5 or 100
2.	1 KV	5 or 100	0.5 KV	5 or 100
3.	2 KV	5 or 100	1 KV	5 or 100
4.	4 KV	5 or 100	2 KV	5 or 100
X	Special	Special	Special	Special
NOTE 1 Use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.				
NOTE 2 With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.				
“X” is an open level. The level has to be specified in the dedicated equipment specification.				

### 10.3.2 Performance criterion: **B**

## 10.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

## 10.5 Operating Condition of EUT

10.5.2 Setup the EUT as shown in Section 10.1.

10.5.3 Turn on the power of all equipments.

10.5.4 Let the EUT work in test mode (Charging) and measure it.



## 10.6 Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

### 10.6.2 For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

### 10.6.3 For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

## 10.7 Test Results

**PASS.**

Please refer to the following page.

# Electrical Fast Transient/Burst Test Results

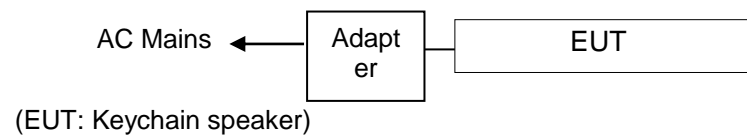
EMTEK(DONGGUAN) CO., LTD.

Standard :	<input checked="" type="checkbox"/> IEC 61000-4-4 <input type="checkbox"/> EN 61000-4-4	Result : <input checked="" type="checkbox"/> PASS / <input type="checkbox"/> FAIL	
Applicant : _____			
EUT : <u>Keychain speaker</u>			
M/N : <u>SL175</u>			
Input Voltage: <u>AC 230V/50Hz</u>			
Criterion : <u>B</u>			
Ambient Condition : <u>24 °C</u> <u>55%</u> RH			
Operation Mode : Charging			
Line : <input checked="" type="checkbox"/> AC Mains		Line : <input type="checkbox"/> Signal <input type="checkbox"/> I/O Cable	
Coupling : <input checked="" type="checkbox"/> Direct		Coupling : <input type="checkbox"/> Capacitive	
Test Time : 120s			
Line	Test Voltage	Result (+)	Result (-)
L	1KV	PASS	PASS
N	1KV	PASS	PASS
PE			
L 、 N	1KV	PASS	PASS
L 、 PE			
N 、 PE			
L 、 N 、 PE			
Signal Line			
DC Line			
Note:			
Test Equipment		Burst Tester Model : UCS500M6B	

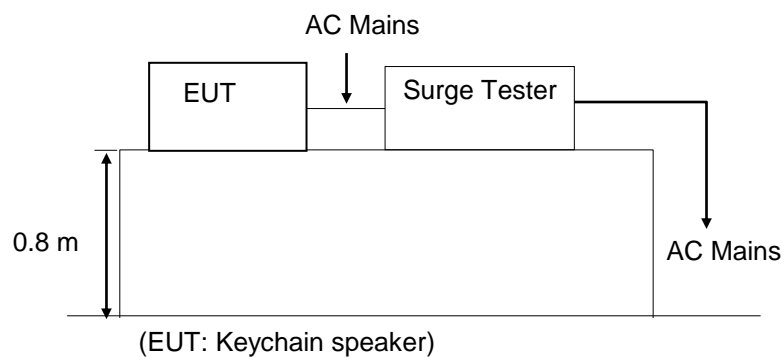
## 11. SURGE IMMUNITY TEST

### 11.1 Block Diagram of Test Setup

#### 11.1.1 Block Diagram of the EUT



#### 11.1.2 Surge Test Setup



### 11.2 Test Standard

EN 55035: 2017

(IEC 61000-4-5: 2014, Severity Level: Line to Line: Level 2, 1.0KV, Line to earth: Level 3, 2.0KV)

## 11.3 Severity Levels and Performance Criterion

### 11.3.1 Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

### 11.3.2 Performance criterion: **B**

## 11.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

## 11.5 Operating Condition of EUT

11.5.1 Setup the EUT as shown in Section 11.1.

11.5.2 Turn on the power of all equipments.

11.5.3 Let the EUT work in test mode (Charging) and measure it.

## 11.6 Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.1.2.
- 2) For line to line and line to earth coupling mode, provide a 1.0KV and 2.0KV, 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 4) Different phase angles are done individually.
- 5) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

## 11.7 Test Results

**PASS.**

Please refer to the following page.

## Surge Immunity Test Results

EMTEK(DONGGUAN) CO., LTD.

Applicant : _____				Test Date : <u>April 25, 2018</u>	
EUT : Keychain speaker				Temperature : <u>24°C</u>	
M/N : <u>SL175</u>				Humidity : <u>55%</u>	
Power Supply : <u>AC 230V/50Hz</u>				Test Engineer : <u>Lin</u>	
Test Mode : <u>Charging</u>				Criterion : <u>B</u>	

Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Result
L-N	±	0°	5	1.0	PASS
	±	90°	5	1.0	PASS
	±	180°	5	1.0	PASS
	±	270°	5	1.0	PASS
L-PE					
N-PE					

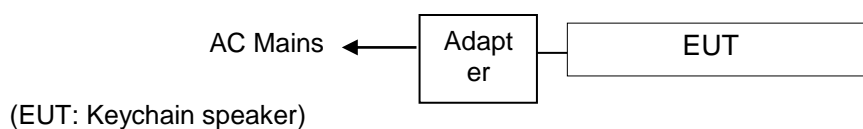
  

Remark:	Test Equipment : Surge Generator VCS 500M6T
---------	--

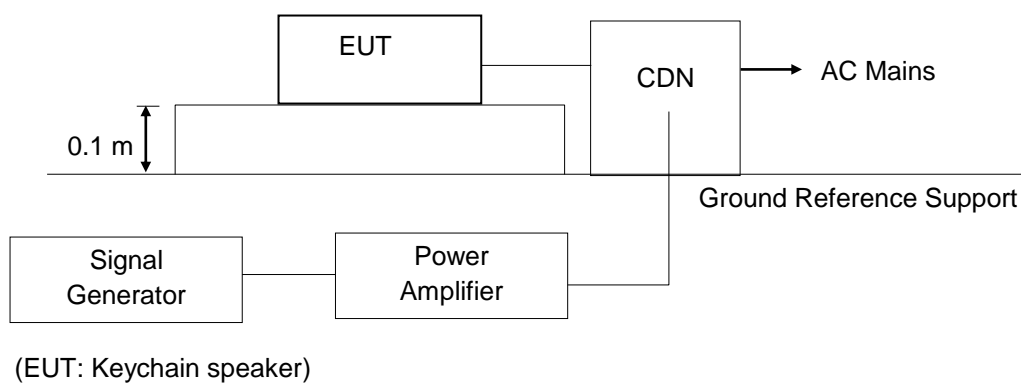
## 12. INJECTED CURRENTS SUSCEPTIBILITY TEST

### 12.1 Block Diagram of Test Setup

#### 12.1.1 Block Diagram of the EUT



#### 12.1.2 Block Diagram of Test Setup



### 12.2 Test Standard

EN 55035: 2017

(IEC 61000-4-6: 2013, Test Level: 3V (rms), 0.15MHz ~ 10MHz;

Test Level: 3V ~1V (rms), 10MHz ~ 30MHz; Test Level: 1V (rms), 30MHz ~ 80MHz;)

## 12.3 Severity Levels and Performance Criterion

### 12.3.1 Severity level

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

### 12.3.2 Performance criterion: **A**

## 12.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

## 12.5 Operating Condition of EUT

12.5.2 Setup the EUT as shown in Section 12.1.

12.5.3 Turn on the power of all equipments.

12.5.4 Let the EUT work in test mode (Charging) and measure it.

## 12.6 Test Procedure

- 1) Set up the EUT, CDN and test generators as shown on Section 12.1.2.
- 2) Let the EUT work in test mode and measure it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
- 7) The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

## 12.7 Test Results

### **PASS.**

These test result outsourced to EMTEK(SHENZHEN) CO., LTD.

Please refer to the following page.

# Injected Currents Susceptibility Test Results

EMTEK(SHENZHEN) CO., LTD.

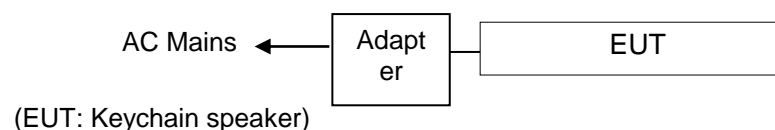
Applicant : _____ EUT : Keychain speaker M/N : SL175 Power Supply : AC 230V/50Hz			Test Date : April 25, 2018 Temperature : 24°C Humidity : 55% Test Engineer : Lin	
Test Mode : Charging				
Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 ~ 10	AC Mains	3V(rms)	A	PASS
10 ~ 30	AC Mains	3V(rms) to 1V(rms)	A	PASS
30 ~ 80	AC Mains	1V(rms)	A	PASS
Test Mode : _____				
Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
Remark : 1. Modulation Signal:1KHz 80% AM Measurement Equipment : Simulator: CWS500C (SWITZERLAND EMTEST) CDN : <input type="checkbox"/> CDN-M2 (SWITZERLAND EMTEST) <input checked="" type="checkbox"/> CDN-M3 (SWITZERLAND EMTEST)		Note:		



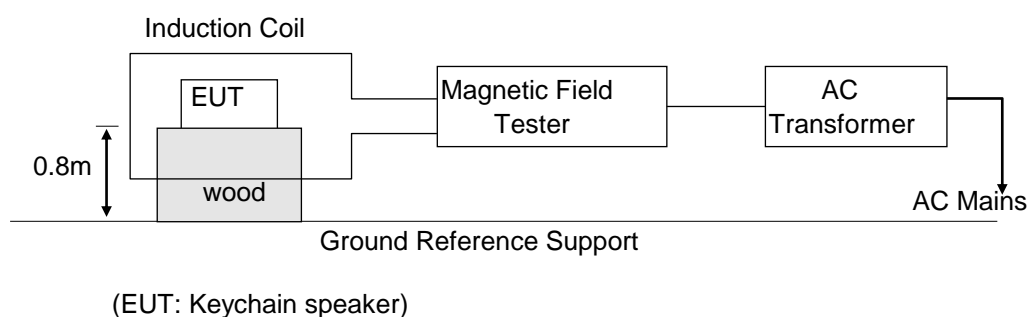
## 13. MAGNETIC FIELD IMMUNITY TEST

### 13.1 Block Diagram of Test Setup

#### 13.1.1 Block Diagram of the EUT



#### 13.1.2 Block Diagram of Test Setup



### 13.2 Test Standard

EN 55035: 2017  
(IEC 61000-4-8: 2009, Severity Level 1: 1A/m)

### 13.3 Severity Levels and Performance Criterion

#### 13.3.1 Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X	Special

#### 13.3.2 Performance criterion: A

### 13.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

### 13.5 Operating Condition of EUT

- 13.5.1 Setup the EUT as shown in Section 13.1.
- 13.5.2 Turn on the power of all equipments.
- 13.5.3 Let the EUT work in test mode (Charging) and measure it.

### 13.6 Test Procedure

The EUT is placed in the middle of a induction coil (1\*1m), under which is a 1\*1\*0.1m (high)table, this small table is also placed on a larger table, 0.8 m above the ground. X, Y and Z polarization of the induction coil are set on test, so that each side of the EUT is affected by the magnetic field. Also it can reach the same aim by changing the position of the EUT.

### 13.7 Test Results

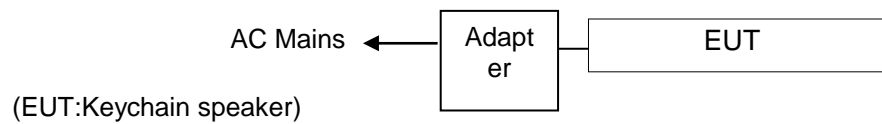
**N/A.**

According to IEC 61000-4-8, this standard needs only to be applied to equipment containing components susceptible to magnetic fields. Considering that the sample doesn't contain this kind of components, it is unnecessary to perform this test item.

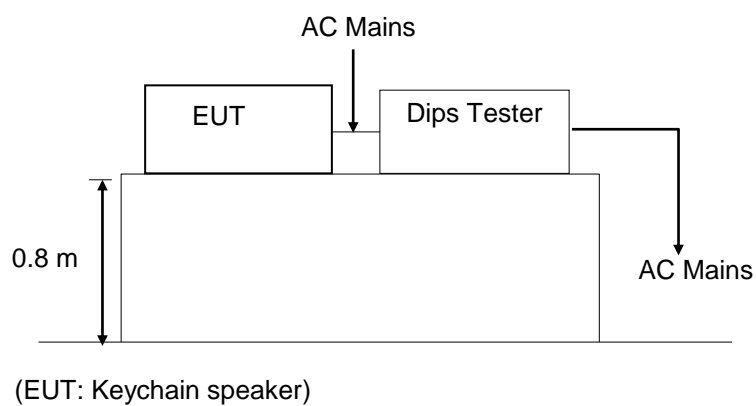
## 14. VOLTAGE DIPS AND INTERRUPTIONS TEST

### 14.1 Block Diagram of Test Setup

#### 14.1.1 Block Diagram of the EUT



#### 14.1.2 Dips Test Setup



### 14.2 Test Standard

EN 55035: 2017  
(IEC 61000-4-11: 2004)

## 14.3 Severity Levels and Performance Criterion

### 14.3.1 Severity level

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)
0	100	0.5
40	60	1
70	30	5
		10
		25
		50
		*

### 14.3.2 Performance criterion: **B, C**

## 14.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

## 14.5 Operating Condition of EUT

- 14.5.1 Setup the EUT as shown in Section 14.1.
- 14.5.2 Turn on the power of all equipments.
- 14.5.3 Let the EUT work in test mode (Charging) and measure it.

## 14.6 Test Procedure

- 1) Set up the EUT and test generator as shown on Section 14.1.2.
- 2) The interruption is introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

## 14.7 Test Results

**PASS.**

These test result outsourced to EMTEK(SHENZHEN) CO., LTD.

Please refer to the following page.

# Voltage Dips And Interruptions Test Results

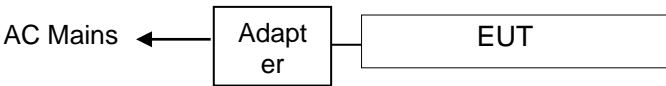
EMTEK(SHENZHEN) CO., LTD.

Applicant : _____  EUT : Keychain speaker M/N : SL175 Test Model : Charging			Test Date : April 25, 2018  Temperature : 24°C Humidity : 55% Test Engineer : Lin	
Power Supply : AC 230V/50Hz				
Test Level % U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (in period)	Criterion <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Result
70	30	25P	C	PASS
0	100	250P	C	PASS
0	100	0.5P	B	PASS
Power Supply : _____				
Test Level % U <sub>T</sub>	Voltage Dips & Short Interruptions % U <sub>T</sub>	Duration (in period)	Criterion <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D	Result
Remark: U <sub>T</sub> is the rated voltage for the equipment.			Test Equipment : 45KVA AC Power source NSG 1007-45/45KVA	

15. BROADBAND REPETITIVE NOISE IMPULSES TEST

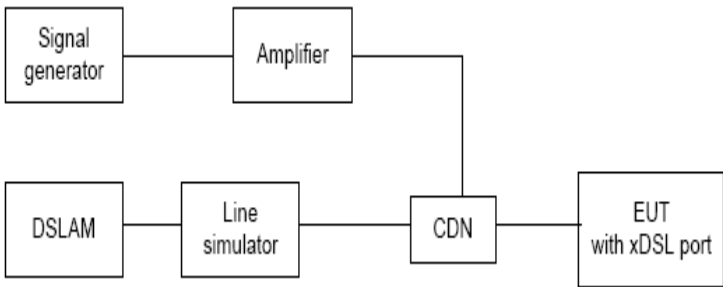
15.1 Block Diagram of Test Setup

15.1.1 Block Diagram of the EUT



(EUT: Keychain speaker)

15.1.2 Block Diagram of Test Setup



(EUT: Keychain speaker)

15.2 Test Standard

EN 55035: 2017 Section 4.2.7

15.3 Severity Levels and Performance Criterion

15.3.1 Severity level

Impulse Frequency (MHz)	Test Level (dbuV)	Duration (ms)
0.15-0.5	107	0.7 8.3(for 50HZ) 10(for 60HZ)
0.5-10	107-36	
10-30	36-30	

15.3.2 Performance criterion: A

## 15.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.

## 15.5 Operating Condition of EUT

- 15.5.1 Setup the EUT as shown in Section 15.1.
- 15.5.2 Turn on the power of all equipments.
- 15.5.3 Let the EUT work in test mode (Charging) and measure it.

## 15.6 Test Procedure

The white noise burst should be derived from a longer sequence pseudo-random near-Gaussian white noise generator that may be band-limited to the highest frequency used by the xDSL technology or 30 MHz, whichever is the lowest. This may be generated from an arbitrary waveform source. The length of the sequence from which the noise bursts are generated shall be at least 128 K samples.

The amplifier and CDN used shall have a uniform frequency response that does not change by more than 3 dB over the frequency range that extends from 150 kHz to the highest frequency used by the xDSL technology or 30 MHz, whichever is the lowest. It is recommended that the CDN should have an LCL of at least 60 dB over the relevant frequency range. Equipment that satisfies the performance criteria when tested using a CDN with a lower LCL value shall be deemed to meet the requirements.

## 15.7 Test Results

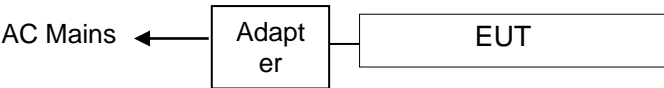
**N/A.**

According to EN 55035: 2017 Section 4.2.7, this test needs only to be applied to xDSL ports of equipment. Considering that the sample doesn't contain this kind of components, it is unnecessary to perform this test item.

16. BROADBAND ISOLATED NOISE IMPULSES TEST

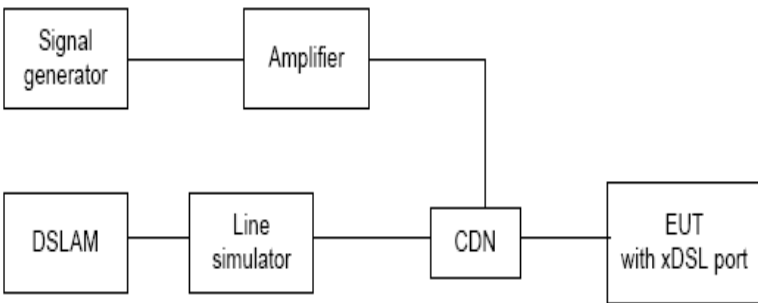
16.1 Block Diagram of Test Setup

16.1.1 Block Diagram of the EUT



(EUT: Keychain speaker)

16.1.2 Block Diagram of Test Setup



(EUT: Keychain speaker)

16.2 Test Standard

EN 55035: 2017 Section 4.2.7

16.3 Severity Levels and Performance Criterion

16.3.1 Severity level

Impulse Frequency (MHz)	Test Level (dbuV)	Duration (ms)
0.15-30	110	0.24 10 300

16.3.2 Performance criterion: B

16.4 EUT Configuration

The configurations of EUT are listed in Section 2.1.



## 16.5 Operating Condition of EUT

- 16.5.1 Setup the EUT as shown in Section 15.1.
- 16.5.2 Turn on the power of all equipments.
- 16.5.3 Let the EUT work in test mode (Charging) and measure it.

## 16.6 Test Procedure

The white noise burst should be derived from a longer sequence pseudo-random near-Gaussian white noise generator that may be band-limited to the highest frequency used by the xDSL technology or 30 MHz, whichever is the lowest. This may be generated from an arbitrary waveform source. The length of the sequence from which the noise bursts are generated shall be at least 128 K samples.

The amplifier and CDN used shall have a uniform frequency response that does not change by more than 3 dB over the frequency range that extends from 150 kHz to the highest frequency used by the xDSL technology or 30 MHz, whichever is the lowest. It is recommended that the CDN should have an LCL of at least 60 dB over the relevant frequency range. Equipment that satisfies the performance criteria when tested using a CDN with a lower LCL value shall be deemed to meet the requirements.

## 16.7 Test Results

**N/A.**

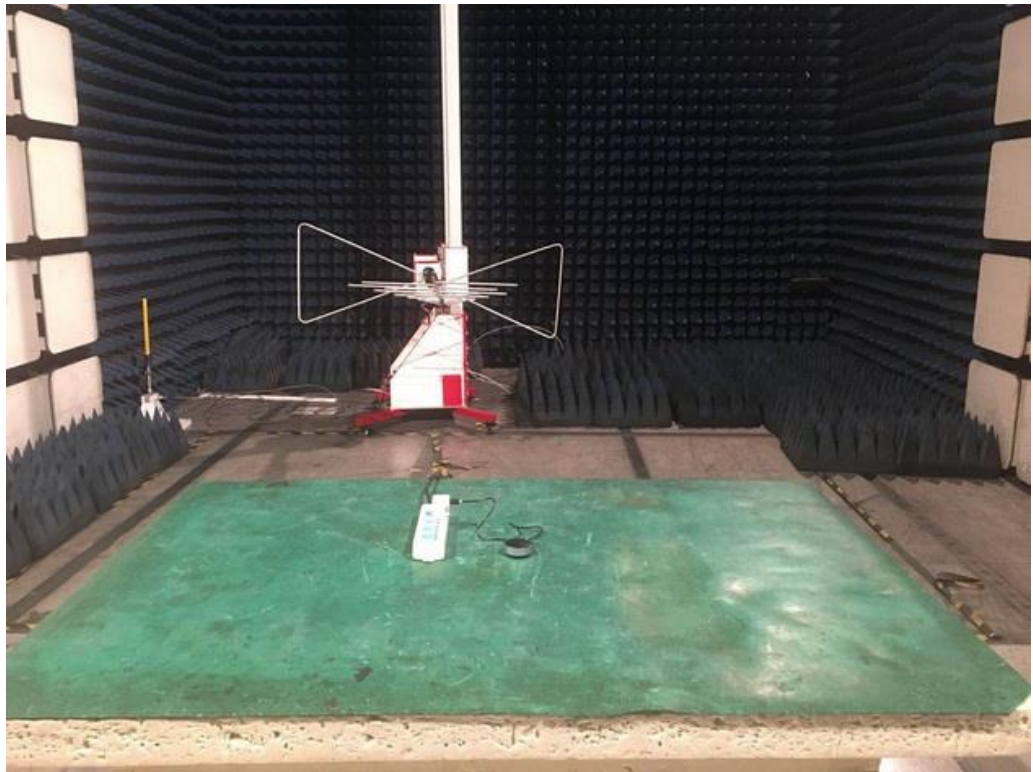
According to EN 55035: 2017 Section 4.2.7, this test needs only to be applied to xDSL ports of equipment. Considering that the sample doesn't contain this kind of components, it is unnecessary to perform this test item.

## 17. PHOTOGRAPH

### 17.1 Photo of Conducted Emission Measurement



### 17.2 Photo of Radiation Emission Measurement



### 17.3 Photo of Harmonic/Flicker Measurement



#### 17.4 Photo of Electrostatic Discharge Test

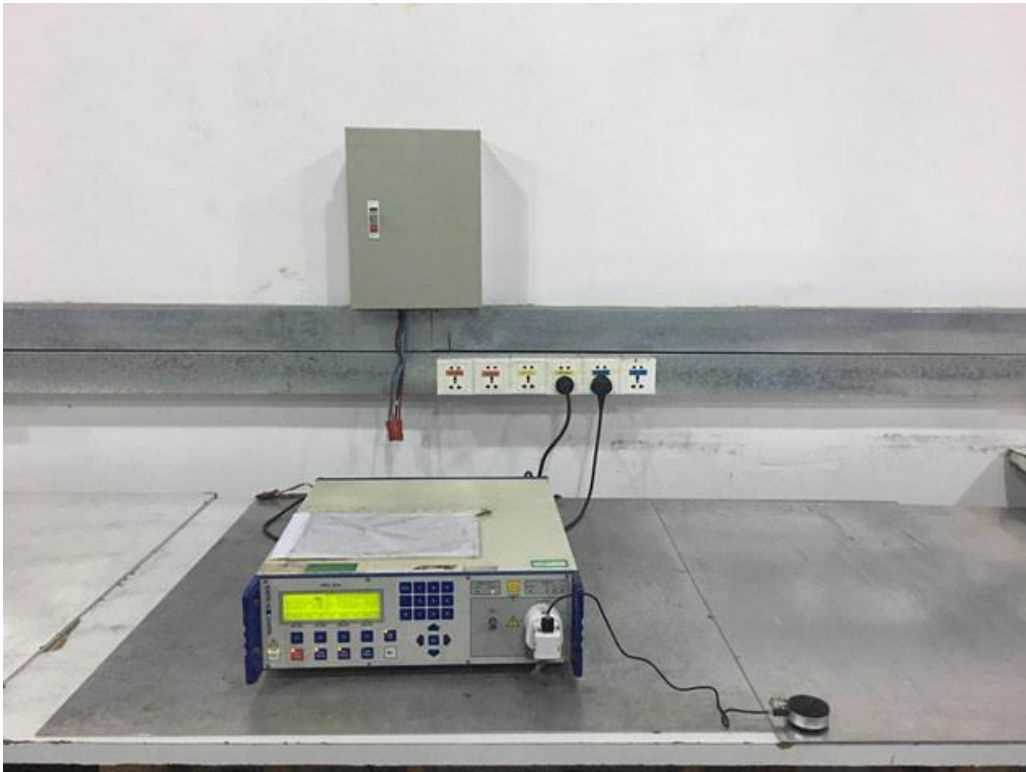


#### 17.5 Photo of RF Field Strength susceptibility Test





17.6 Photo of Electrical Fast Transient /Burst Test



17.7 Photo of Surge Test



17.8 Photo of Injected Currents Susceptibility Test



17.9 Photo of Voltage Dips and Interruption Immunity Test



# APPENDIX I (Photos of EUT)

