EMTEK
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EMC TEST REPORT

For

Wireless Receiver Case

Model No.: P308.831

Prepared for	:	
Address	:	

Prepared By	:	EMTEK(DONGGUAN) CO., LTD.
Address	:	No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China Tel : +86-769-22807078 Fax: +86-769-22807079

Report Number	:	ED171221968E
Date of Test	:	December 21, 2017 to December 28, 2017
Date of Report	:	December 28, 2017

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Test Report Description Page

TEST REPORT DESCRIPTION

Applicant	:	
Manufacturer	:	
EUT	:	Wireless Receiver Case
Model No.	:	P308.831
Input Rating	:	Wireless receive

Measurement Procedure Used:

EN 55011: 2016
EN 55024: 2010+A1: 2015
(IEC61000-4-2: 2008, IEC61000-4-3: 2006+ A1: 2007+ A2: 2010)

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 55011 and EN 55024 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 : December 21, 2017 to December 28, 2017

Prepared by : Lizzy Li/Editor

Reviewer : Rance Ye/Supervisor

Approved & Authorized Signer : Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ED171221968E

1. DESCRIPTION OF STANDARDS AND RESULTS (EUT)

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted Disturbance at Mains Terminals	EN 55011: 2016	Clause 6	N/A
Radiated Disturbance	EN 55011: 2016	Clause 6	Pass
Harmonic Current Emissions	EN 61000-3-2:2014	Class A	N/A
Voltage Fluctuation and Flicker	EN 61000-3-3:2013	Clause 5	N/A
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	N/A
Surge Immunity	IEC 61000-4-5:2014	B	N/A
Conducted RF Immunity	IEC 61000-4-6:2013	A	N/A
Power Frequency Magnetic Field	IEC 61000-4-8:2009	A	N/A
Voltage Dips, >95% Reduction	IEC 61000-4-11:2004	B	N/A
Voltage Dips, 30% Reduction		C	N/A
Voltage Interruptions		C	N/A
Note: N/A is an abbreviation for Not Applicable.			

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	: Wireless Receiver Case
Model Number	: P308.831
Trade Mark	: N/A
Power Supply	: Wireless receive
Operate Mode	: Wireless Charging
Applicant	: NINGBO CSTAR IMP & EXP CO., LTD
Address	:
Manufacturer	:
Address	:
Date of sample receiver	: December 21, 2017
Date of Test	: December 21, 2017 to December 28, 2017

2.2. Description of Support Device

iPhone 6	:	Manufacturer: Apple Inc. M/N: A1387 S/N: N/A

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

Conducted Emission Uncertainty	:	2.42dB
Radiated Emission Uncertainty (3m Chamber)	:	3.34dB (30M~1GHz Polarize: H) 3.32dB (30M~1GHz Polarize: V)
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 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 Monitor	SUNSPO	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	549489	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

3.2. 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

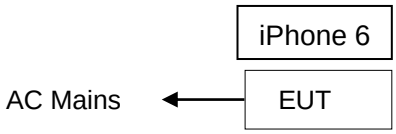
3.3. For RF Strength Susceptibility Test

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

4. RADIATED EMISSION MEASUREMENT

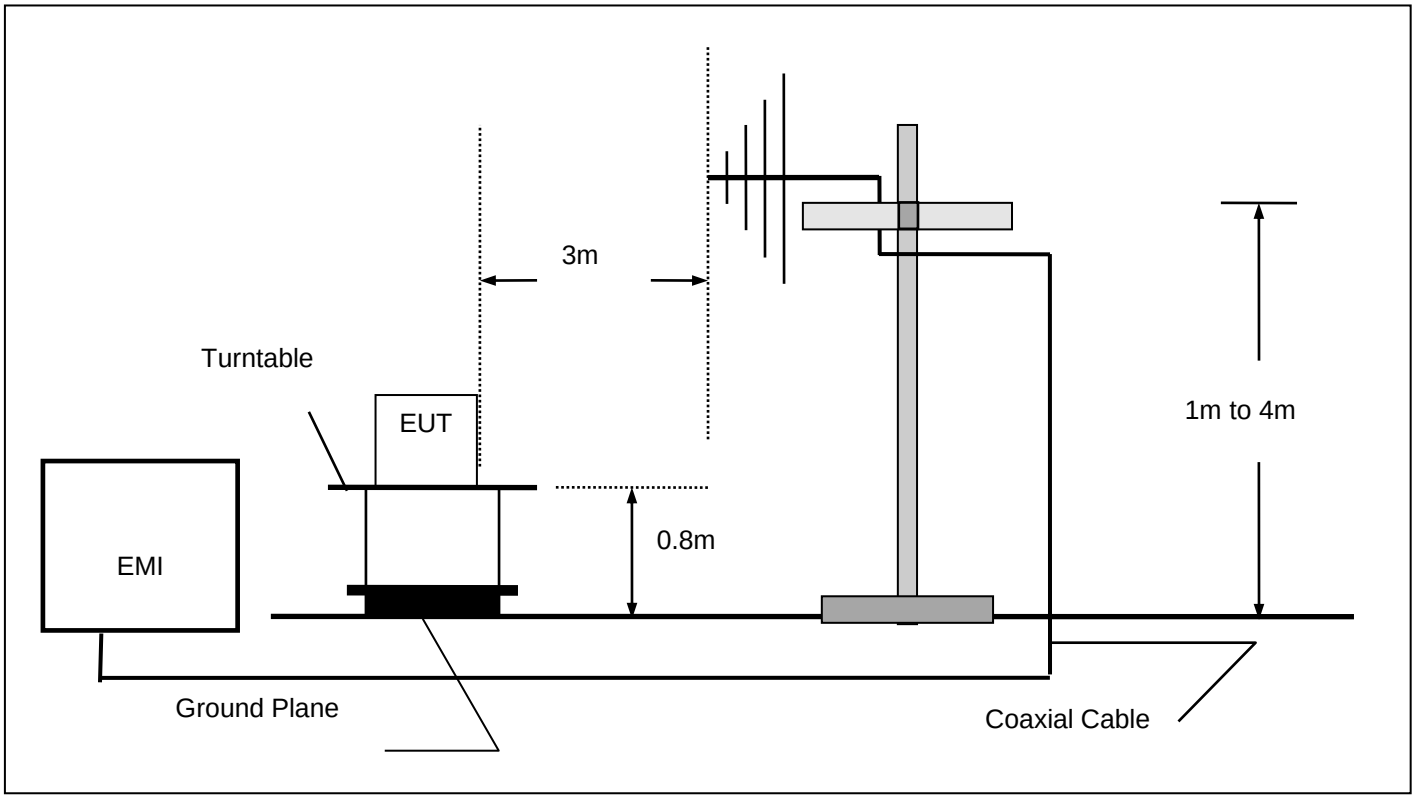
4.1. Block Diagram of Test

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Receiver Case)

4.1.2. Block diagram of test setup (In chamber)



(EUT: Wireless Receiver Case)

4.2. Measuring Standard

EN 55011: 2016

4.3. 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 below 1GHz

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	40
230 ~ 1000	3	47

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.

4.4. EUT Configuration on Test

The EN 55011 regulations test method must be used to find the maximum emission during radiated emission measurement.

EUT	:	Wireless Receiver Case
Model Number	:	P308.831

4.5. Operating Condition of EUT

4.5.1. Turn on the power.

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

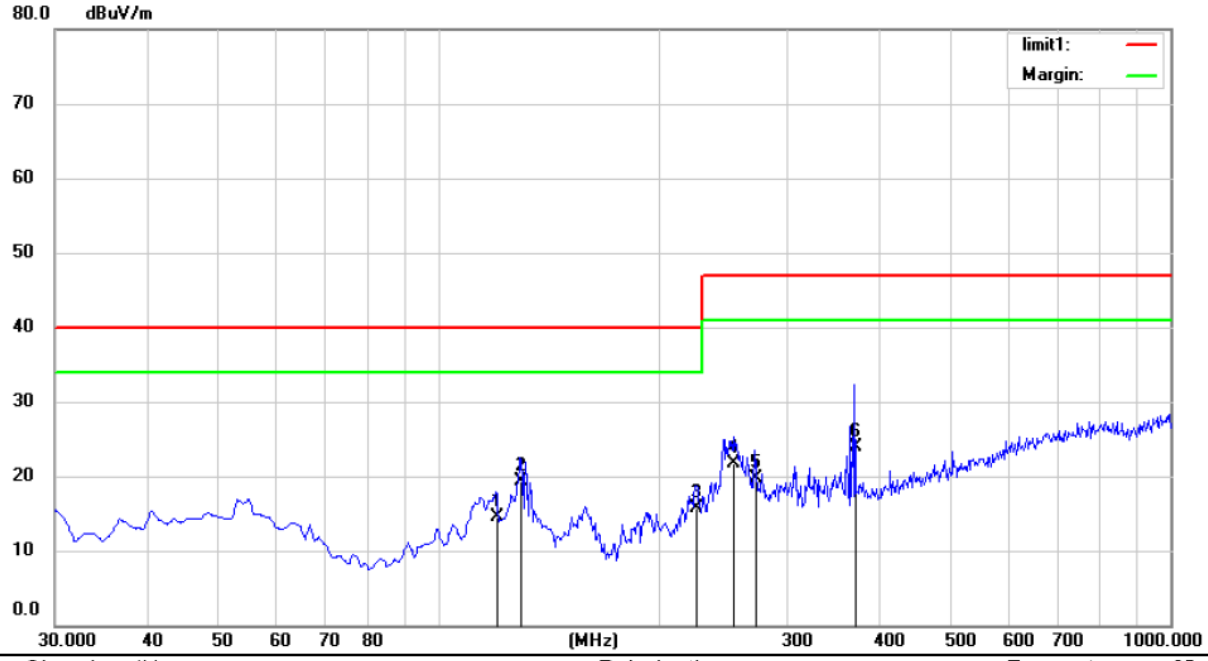
4.6. Test Procedure

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.
The frequency range from 30MHz to 1000MHz is investigated.
The scanning waveforms are below a few pages.

4.7. Test Results

PASS.

The frequency range from 30MHz to 1000MHz is investigated.
Please see the attached pages.



Site Chamber #1 Polarization: *Horizontal* Temperature: 25

Limit: (RE)EN55011_class B_3m Power: Wireless receive Humidity: 55 %

Mode:Wireless Charging

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		120.2100	34.50	-20.01	14.49	40.00	-25.51	QP			
2	*	129.9100	40.60	-21.31	19.29	40.00	-20.71	QP			
3		224.9700	32.30	-16.60	15.70	40.00	-24.30	QP			
4		253.1000	37.20	-15.51	21.69	47.00	-25.31	QP			
5		270.5600	34.60	-14.92	19.68	47.00	-27.32	QP			
6		371.4400	35.60	-11.68	23.92	47.00	-23.08	QP			

*:Maximum data x:Over limit !:over margin Operator: washington

Site Chamber #1 Polarization: *Vertical* Temperature: 25

Limit: (RE)EN55011_class B_3m Power: Wireless receive Humidity: 55 %

Mode:Wireless Charging

Note:

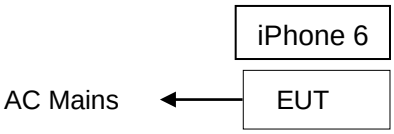
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	30.0000	47.50	-18.76	28.74	40.00	-11.26	QP			
2		34.8500	45.60	-18.63	26.97	40.00	-13.03	QP			
3		49.4000	36.50	-15.64	20.86	40.00	-19.14	QP			
4		119.2400	42.30	-18.95	23.35	40.00	-16.65	QP			
5		126.0300	42.50	-19.58	22.92	40.00	-17.08	QP			
6		146.4000	40.90	-21.66	19.24	40.00	-20.76	QP			

*:Maximum data x:Over limit !:over margin Operator: washington

5. ELECTROSTATIC DISCHARGE TEST

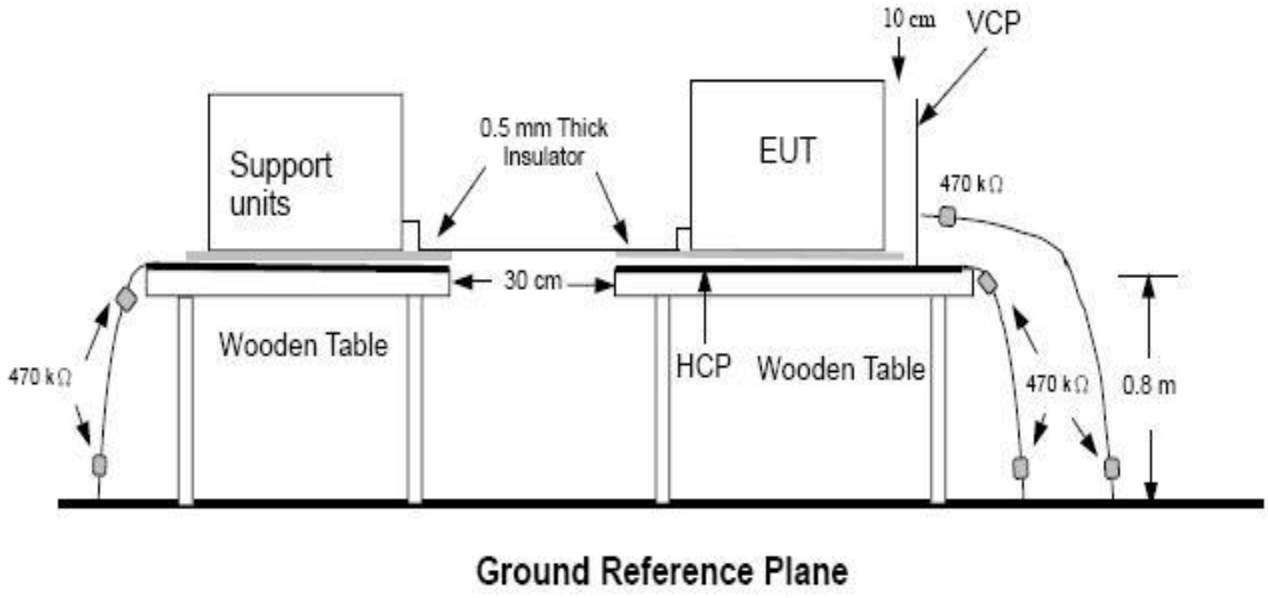
5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Receiver Case)

5.1.2. Block Diagram of ESD Test Setup



(EUT: Wireless Receiver Case)

5.2. Test Standard

EN 55024: 2010+A1: 2015
(IEC61000-4-2: 2008 (Severity Level: 2 /Contact Discharge: ±4KV
Severity Level: 3 / Air Discharge: ±8KV))

5.3. Severity Levels and Performance Criterion

5.3.1. 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

5.3.2. Performance criterion: **B**

5.4. EUT Configuration

The configuration of EUT is listed in Section 4.4.

5.5. Operating Condition of EUT

5.5.1. Setup the EUT as shown in Section 5.1.

5.5.2. Turn on the power of all equipments.

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

5.6. Test Procedure

5.6.1. 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.

5.6.2. Contact Discharge:

All the procedure shall be same as Section 5.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

5.6.3. 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.

5.6.4. 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.

5.7. Test Results

PASS.

Please refer to the following page.

Electrostatic Discharge Test Results

EMTEK(DONGGUAN) CO., LTD.

Applicant :		Test Date :	December 22, 2017
EUT :	Wireless Receiver Case	Temperature :	24℃
M/N :	P308.831	Humidity :	54%
Power Supply :	Wireless receive	Test Engineer:	YE
Test Mode :	Wireless Charging	Criterion :	B

Air Discharge: ±8KV

Contact Discharge: ±4KV # For each point positive 25 times and negative 25 times

Location			Kind A-Air Discharge C-Contact Discharge	Result
Slot of the EUT	5	points	A	PASS
I/O Port	1	points	A	PASS
HCP			C	PASS
VCP			C	PASS

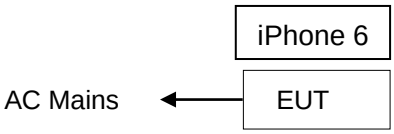
Remark :	Test Equipment : ESD Tester (TESEQ AG, NSG437)

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

6. RF FIELD STRENGTH SUSCEPTIBILITY TEST

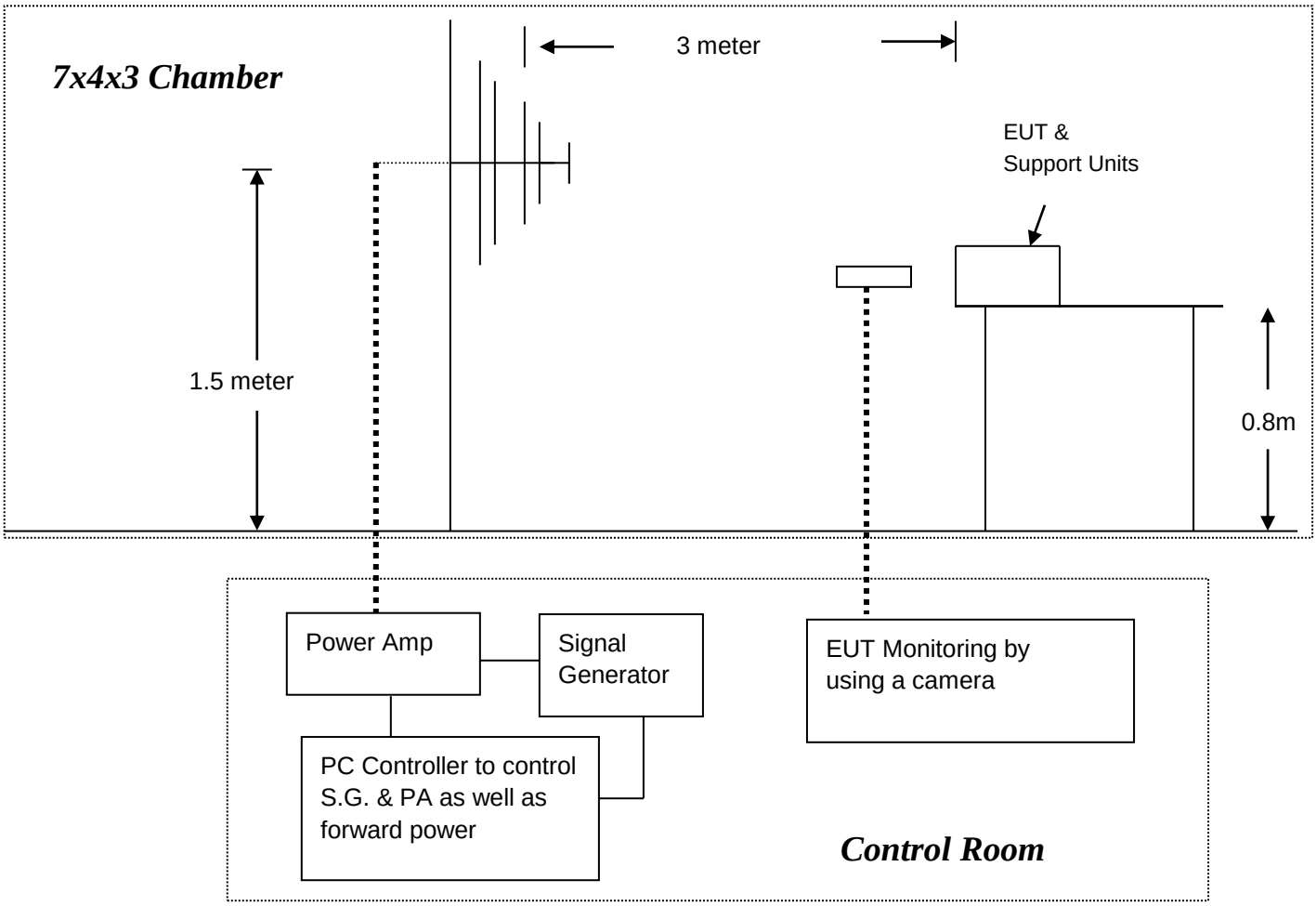
6.1. Block Diagram of Test Setup

6.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Receiver Case)

6.1.2. Block diagram of R/S test set up



(EUT: Wireless Receiver Case)

6.2. Test Standard

EN 55024: 2010+A1: 2015
(IEC61000-4-3: 2006+ A1: 2007+ A2: 2010 (Severity Level: 2, 3V / m))

6.3. Severity Levels and Performance Criterion

6.3.1. Severity level

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

6.3.2. Performance criterion: **A**

6.4. EUT Configuration

The configurations of EUT are listed in Section 4.4.

6.5. Operating Condition of EUT

6.5.1. Setup the EUT as shown in Section 6.1.

6.5.2. Turn on the power of all equipments.

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

6.6. 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	Modulated
3.	Scanning Frequency	80 - 1000 MHz
4.	Dwell time of radiated	0.0015 decade/s
5.	Waiting Time	1 Sec.

6.7. Test Results

PASS.

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

Please refer to the following page.

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RF Field Strength Susceptibility Test Results

EMTEK(SHENZHEN) CO., LTD.

Applicant:

Test Date : December 22, 2017

EUT : Wireless Receiver Case

Temperature : 24℃

M/N : P308.831

Humidity : 50%

Field Strength: 3 V/m

Criterion: A

Power Supply: Wireless receive

Frequency Range: 80 - 1000MHz

Test Engineer: YE

Modulation: ☑ AM ☐ Pulse ☐none 1 KHz 80%

Test Mode : Wireless Charging

	Frequency Range : 80 - 1000MHz	
Steps	1 %	
	Horizontal	Vertical
Front	PASS	PASS
Right	PASS	PASS
Rear	PASS	PASS
Left	PASS	PASS

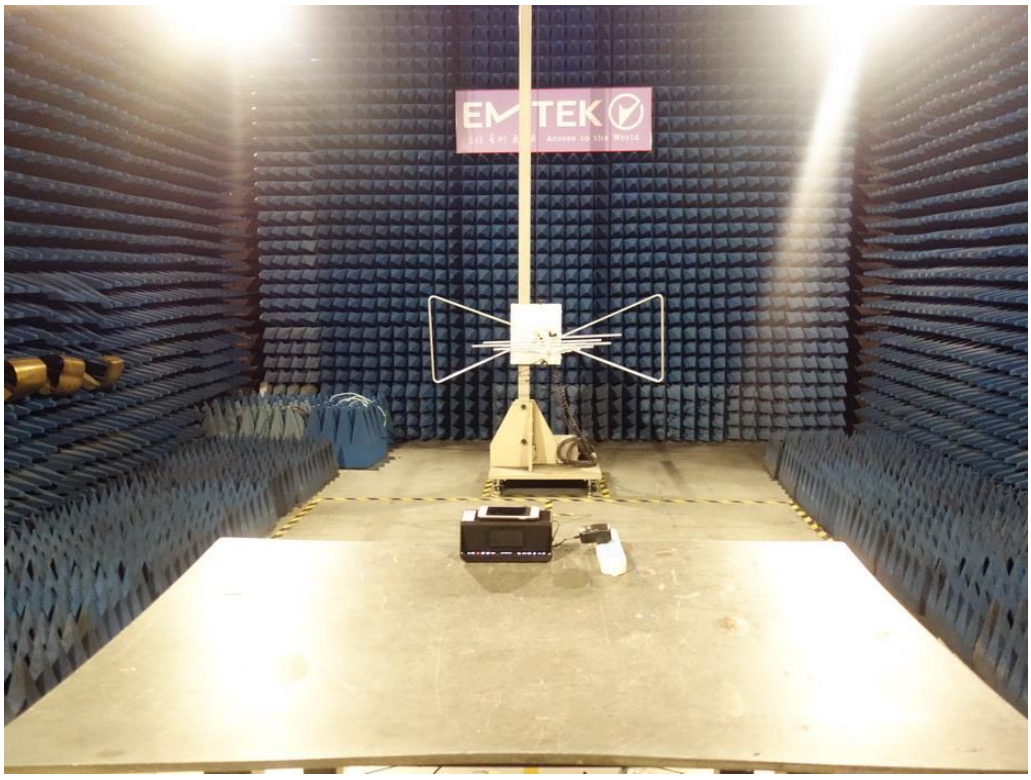
Test Equipment :

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:

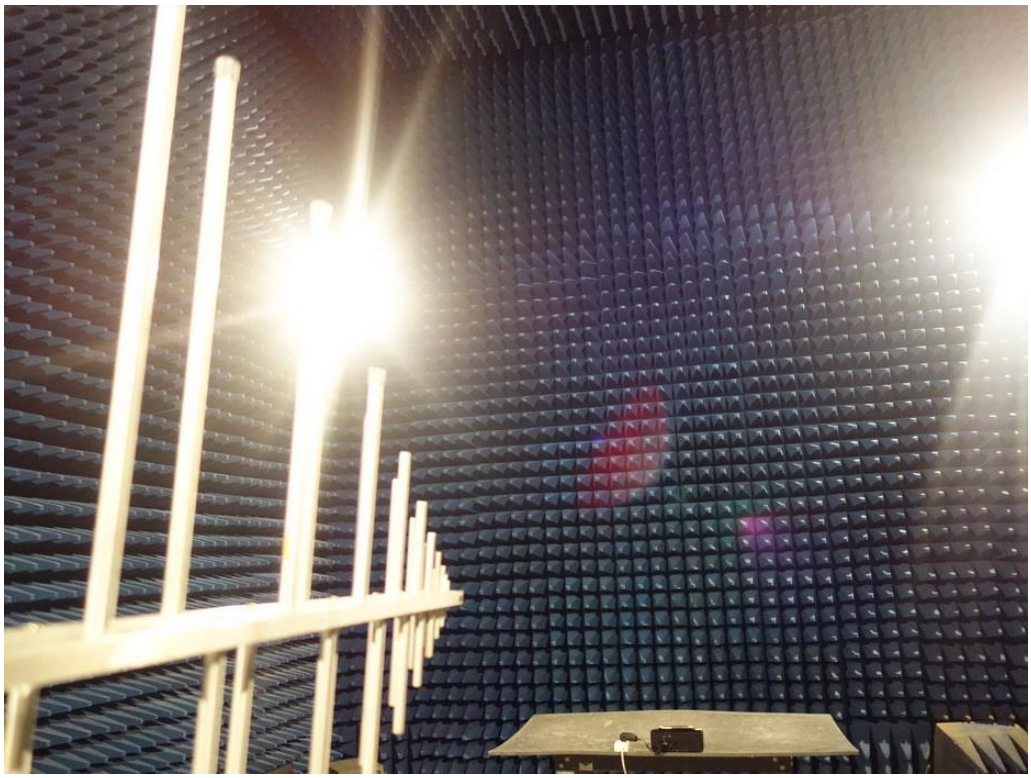
7. PHOTOGRAPH

7.1. Photo of Radiation Emission Measurement



7.2. Photo of Electrostatic Discharge Test

7.3. Photo of RF Field Strength Susceptibility Test



APPENDIX
(Photos of EUT)