

ETSI EN 301 489-1 V2.2.0 (2017-03)  
ETSI EN 301 489-3 V2.1.1 (2017-03)

## TEST REPORT

For

**Hangzhou Hikvision Digital Technology Co., Ltd.**

No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China

**Tested Model: DS-PD1-MC-WWS**

<b>Report Type:</b> Amended Report	<b>Product Type:</b> Wireless Magnetic Contact
<b>Test Engineer:</b> Lee Li	Lee Li
<b>Report Number:</b> RKSA180727004-02	
<b>Report Date:</b> 2018-07-31	
<b>Reviewed By:</b> Ray Wang EMC Leader	Ray Wang
<b>Test Laboratory:</b> Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>	

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FINAL

**Report Revision**

<b>Report Number</b>	<b>Report Date</b>	<b>Contents</b>
RKSA180418003-02	2018-05-09	Original Report Invalidated
RKSA180727004-02	2018-07-31	Amended Report

FINAL

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	Hangzhou Hikvision Digital Technology Co., Ltd.
Test Model	DS-PD1-MC-WWS
Product Name	Wireless Magnetic Contact
Rate Voltage	Battery Voltage DC 3V
Highest Operation Frequency	433MHz
Dimension	84 mm (L) * 25mm (W) *21 mm (H)

*\*All measurement and test data in this report was gathered from production sample serial number: 20180727004. (Assigned by BACL, Kunshan).The EUT supplied by the applicant was received on 2018-07-27.*

### Objective

This test report is prepared on behalf of Hangzhou Hikvision Digital Technology Co., Ltd. in accordance with:

ETSI EN 301489-1 V2.2.0 (2017-03), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

ETSI EN 301489-3 V2.1.1 (2017-03), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz.

The objective is to determine compliance with ETSI EN 301489-1 V2.2.0 (2017-03), ETSI EN 301489-3 V2.1.1 (2017-03).

### Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.0 (2017-03).

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

*Test mode: Alarm functions open*

### EUT Exercise Software

No software was used to test.

### Equipment Modifications

No modifications were made to the EUT.

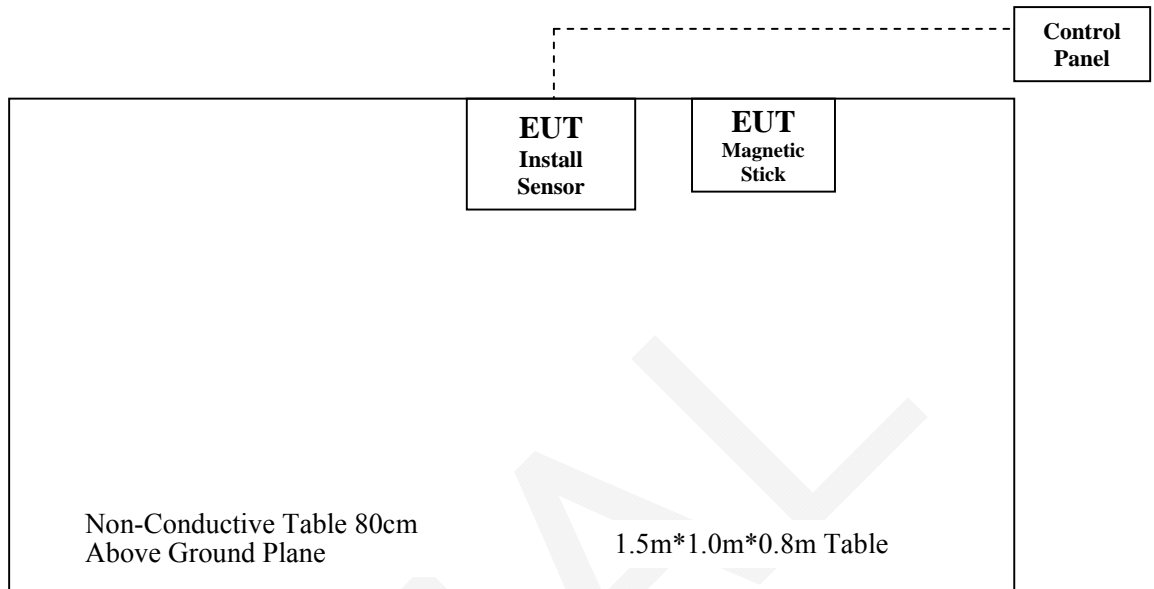
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Hangzhou Hikvision Digital Technology Co., Ltd.	Control Panel	DS-PD2-P10P-W	Q00057177

### External I/O Cable

Cable Description	Length (m)	From/Port	To
/	/	/	/

**Configuration of Radiation Test Setup**



## SUMMARY OF TEST RESULTS

	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliance
	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable
	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Not Applicable
	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Not Applicable
	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Not Applicable
	Reference to clauses EN 301 489-1 §8.7 Wired network ports	Not Applicable
§7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliance
	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 6000 MHz) (EN 61000-4-3)	Compliance
	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Not Applicable
	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Not Applicable
	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Not Applicable
	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Not Applicable
	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	Not Applicable*

**Note:**

Not Applicable: The EUT was powered by battery, and there no wired network ports.

Not Applicable\*: This equipment will not in Vehicular environment.

**Immunity test performance criteria:**

“A “ means : CT/CR Reference to clauses EN 301 489-1 §6.1/EN 301 489-3 §6.2

“B” means : TT/TR Reference to clauses EN 301 489-1 §6.2/EN 301 489-3 §6.2



## §8.2 - RADIATED EMISSIONS

### Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  of Table 1, then:

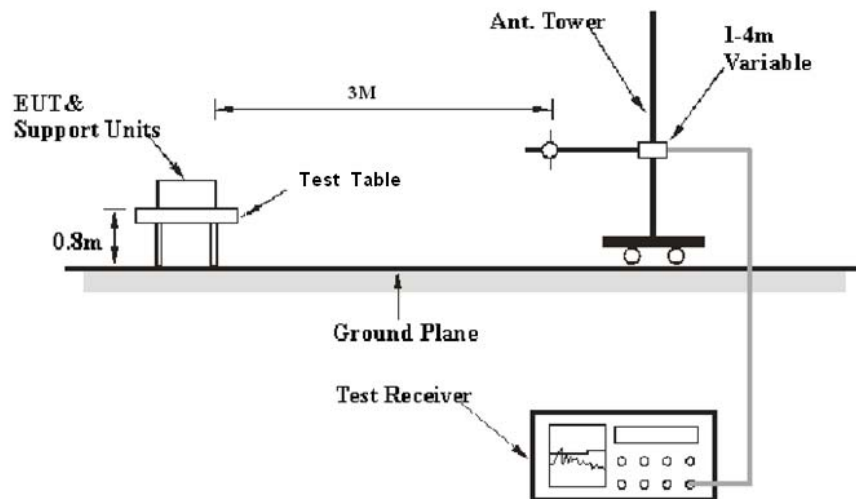
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Table 1 – Values of  $U_{cispr}$

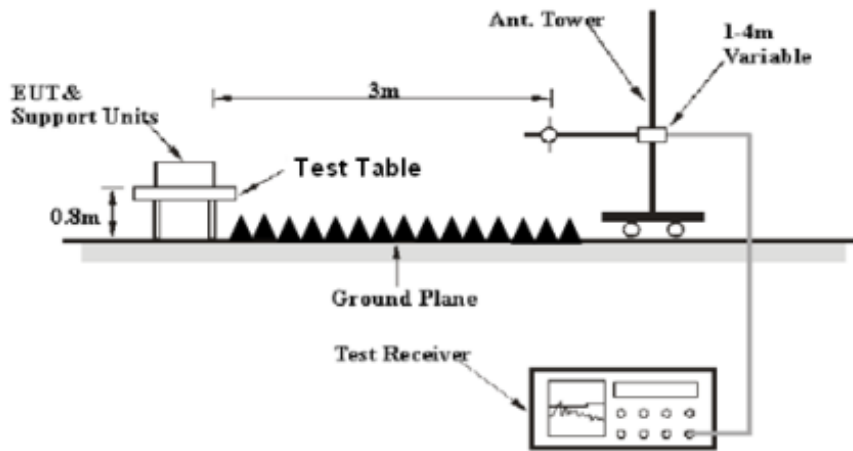
Item	Measurement Uncertainty	$U_{cispr}$	
Radiated Emission	30MHz~1GHz	5.91dB	6.3 dB
	1GHz~6GHz	4.68dB	5.2 dB
	6 GHz ~18 GHz	5.23dB	5.5 dB

### Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ETSI EN 301 489-1 V2.2.0 (2017-03). The specification used was the ETSI EN 301 489-1 V2.2.0 (2017-03).

The spacing between the peripherals was 10 cm.

**EMI Test Receiver Setup**

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector Type
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	1MHz	AVG

**Test Procedure**

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	171205	2017-08-14	2018-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	EMI Receiver	ESU40	100207	2017-08-27	2018-08-26
R&S	Auto test Software	EMC32	100361	-	-
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
Champrotek	Chamber	Chamber B	T-KSEMC080	-	-
Narda	Pre-amplifier	AFS42-00101800	2001270	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-8	008	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-4	004	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2017-12-12	2018-12-11

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**Corrected Amplitude & Margin Calculation**

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

$$\text{Corr. Amp.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amp}$$

**Test Data**

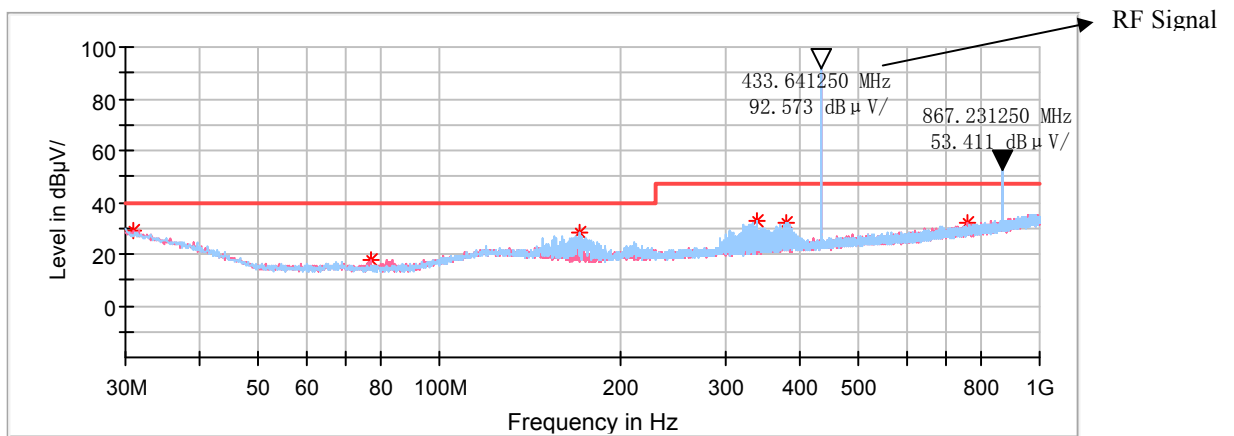
**Environmental Conditions**

<b>Temperature:</b>	24.1°C
<b>Relative Humidity:</b>	55%
<b>ATM Pressure:</b>	101.2 kPa-

\* The testing was performed by Lee Li on 2018-07-30.

Test mode: Alarm functions open

**Below 1GHz**



Frequency (MHz)	Peak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB /m)
30.970000	28.77	40.00	11.23	200.0	V	0.0	-4.6
76.681250	17.95	40.00	22.05	100.0	V	270.0	-17.6
171.741250	28.43	40.00	11.57	200.0	H	88.0	-13.2
339.066250	32.89	47.00	14.11	100.0	H	261.0	-9.6
377.987500	32.09	47.00	14.91	100.0	H	235.0	-8.6
756.166250	31.87	47.00	15.13	100.0	V	141.0	-2.4

备注:

**Above 1 GHz:**

Frequency (MHz)	MaxPeak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1430.050000	---	23.06	50.00	26.94	100.0	H	14.0	-8.8
1430.050000	34.95	---	70.00	35.05	200.0	H	44.0	-8.8
1949.400000	---	25.65	50.00	24.35	200.0	V	31.0	-5.9
1949.400000	38.15	---	70.00	31.85	100.0	V	353.0	-5.9
2400.600000	---	27.09	50.00	22.91	200.0	H	235.0	-4.3
2400.600000	39.86	---	70.00	30.14	100.0	H	87.0	-4.3
2858.850000	---	28.73	50.00	21.27	100.0	H	5.0	-2.3
2858.850000	41.57	---	70.00	28.43	200.0	H	298.0	-2.3
3770.650000	---	31.75	54.00	22.25	200.0	H	156.0	0.3
3770.650000	42.32	---	74.00	31.68	200.0	H	156.0	0.3
4609.600000	---	33.72	54.00	20.28	100.0	H	0.0	2.0
4609.600000	43.08	---	74.00	30.92	100.0	H	0.0	2.0

## §9.3 - ELECTROSTATIC DISCHARGE

### Measurement Uncertainty

$U_{lab}$  (measurement uncertainty of lab) and  $U_{EN}$  (measurement uncertainty of EN 61000-4-2) please refer to the following:

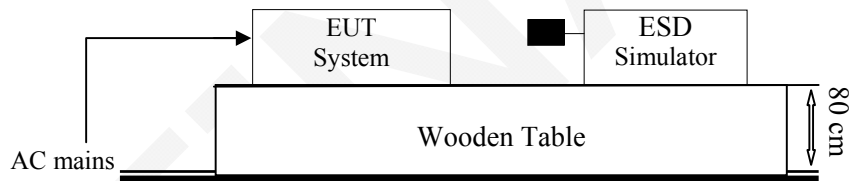
Parameter	$U_{EN}$	$U_{lab}$
Rise time $t_r$	$\leq 15\%$	15%
Peak current $I_p$	$\leq 7\%$	6.30%
Current at 30 ns	$\leq 7\%$	6.30%
Current at 60 ns	$\leq 7\%$	6.30%

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	ESD Simulator	Dito	V0824103870	2017-10-11	2018-10-11

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

### Test Standard

ETSI EN 301 489-1 V2.2.0 (2017-03) / EN 61000-4-2: 2009

Test Level 3 for Air Discharge at  $\pm 8$  kV

Test Level 2 for Contact Discharge at  $\pm 4$  kV

**Test Level**

Level	Test Voltage Contact Discharge ( $\pm$ kV)	Test Voltage Air Discharge ( $\pm$ kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

**Performance criterion: B****Test Procedure****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 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

**Contact Discharge:**

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

**Indirect discharge for horizontal coupling plane**

At least 50 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.

**Indirect discharge for vertical coupling plane**

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m \* 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.

**Test Data and Setup Photo**

**Environmental Conditions**

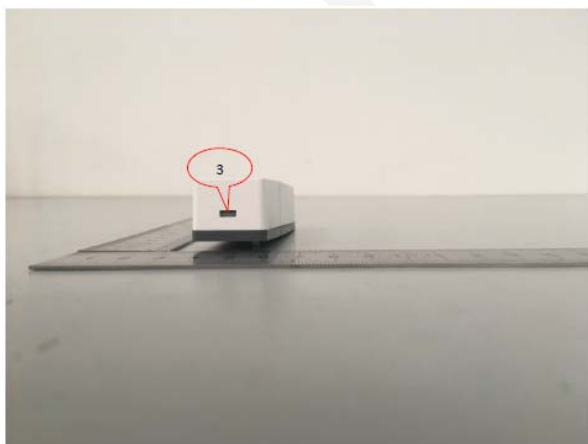
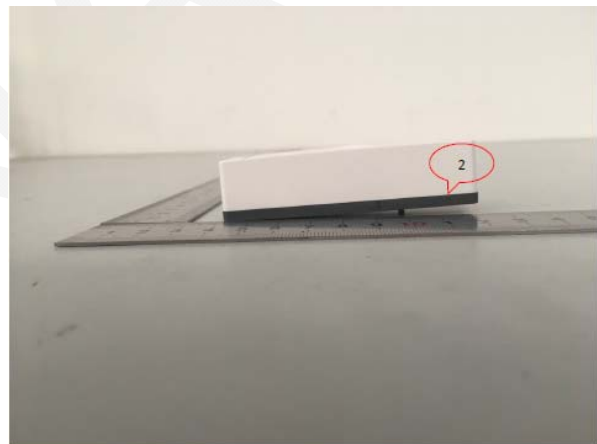
<b>Temperature:</b>	19 °C
<b>Relative Humidity:</b>	47 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Lee Li on 2018-07-30.

Test mode: Alarm functions open

Test Points	Contact discharge				Air discharge			
	±2kV	±4kV	±6kV	±8kV	±2kV	±4kV	±8kV	±15kV
<b>VCP</b>	A	A	/	/	/	/	/	/
<b>HCP</b>	A	A	/	/	/	/	/	/
<b>1~3</b>	/	/	/	/	A	A	A	/

Test point as follows:





## §9.2-RF ELECTROMAGNETIC FIELD (80 MHz - 6000MHz)

### Measurement Uncertainty

$U_{lab}$  (measurement uncertainty of lab) and  $U_{EN}$  (measurement uncertainty of EN 61000-4-3) please refer to the following:

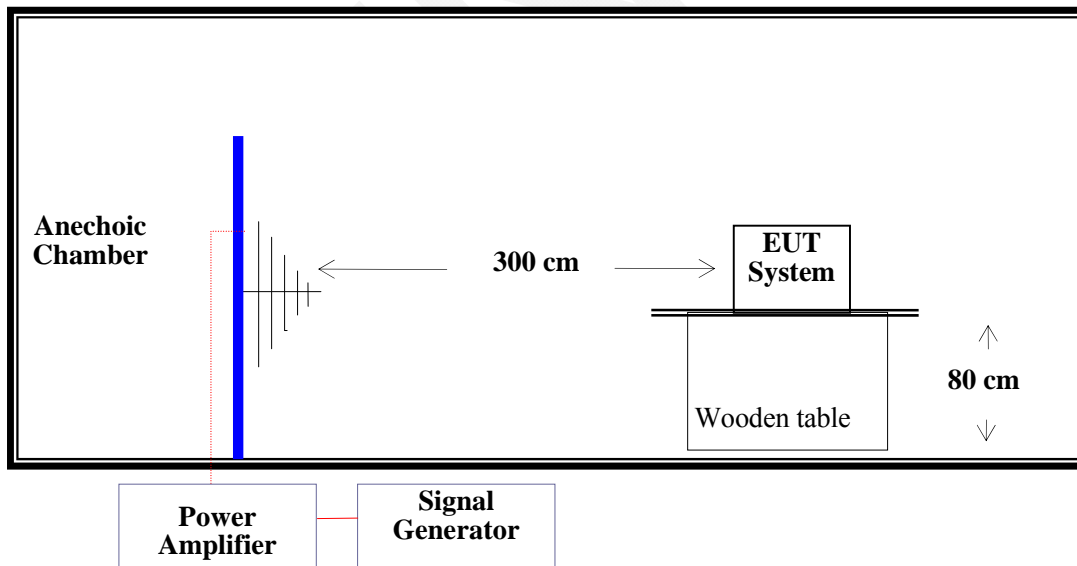
Parameter	$U_{EN}$	$U_{lab}$
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	E4428C	MY49070179	2017-11-12	2018-11-11
A&R	Power Amplifier	60S1G6	0348712	NCR	NCR
Ar	Log Periodic Antenna	ATL80M1G	350122	NCR	NCR
Ar	Log Periodic Antenna	ATT700M12G	350307	NCR	NCR

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test System Setup



**Test Standard**

ETSI EN 301 489-1 V2.2.0 (2017-03) / EN 61000-4-3:2006+A1:2008+A2:2010  
 Test Level 2 at 3V / m  
 Test Levels and Performance Criterion

**Test Level**

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

**Performance Criterion: A****Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the Receiving 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 Receiving antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor the Control Panel.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Test Level 2)
2. Radiated Signal	1 kHz, 80% AM, sine wave
3. Scanning Frequency	80 MHz– 6000 MHz
4. Scanning Frequency Step	1%
5. Dwell Time	3 Sec.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	19 °C
<b>Relative Humidity:</b>	47 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Lee Li on 2018-07-30.

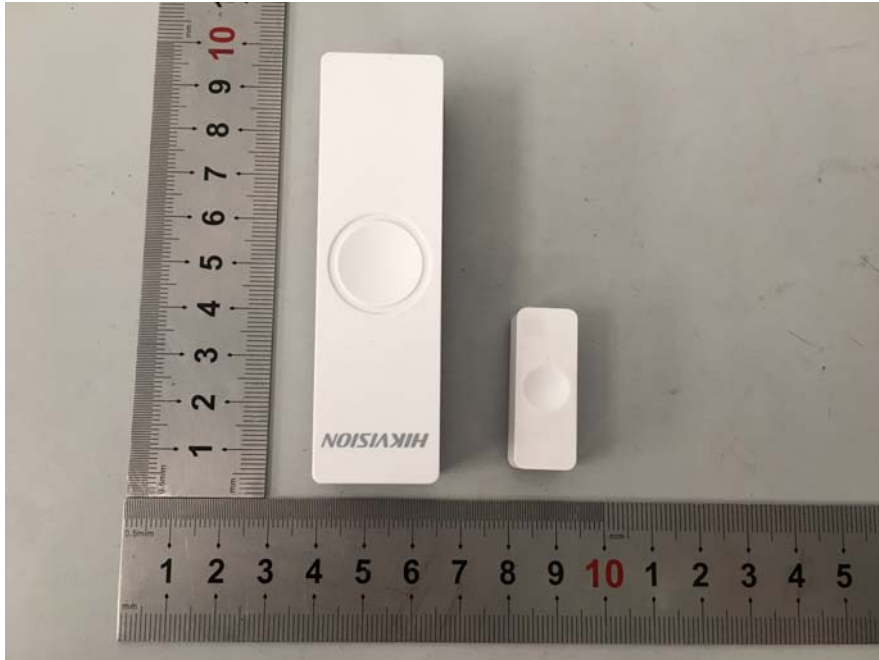
Test mode: Alarm functions open

Frequency Range (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-6000	A	A	A	A	A	A	A	A

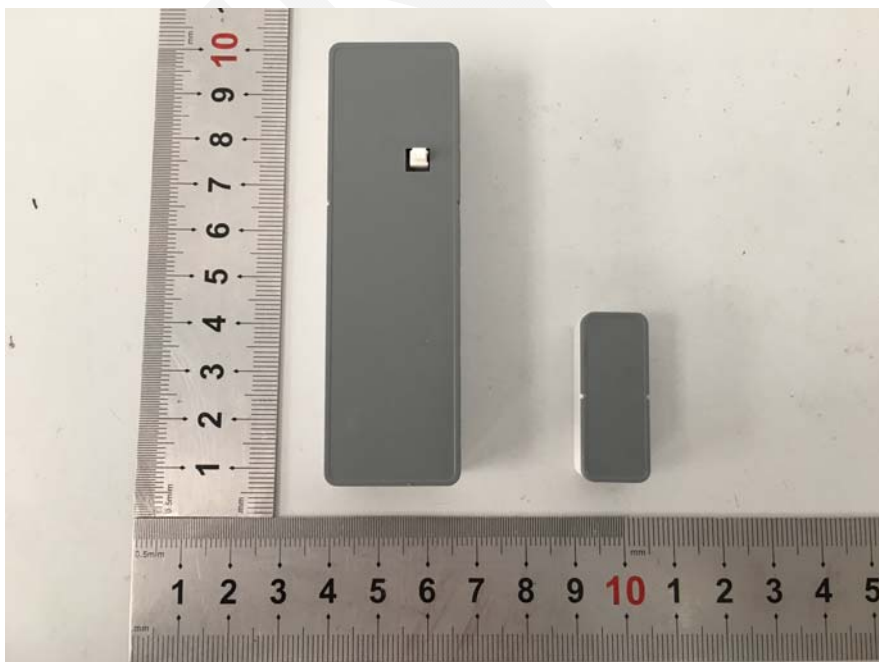
Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

**EXHIBIT A - EUT PHOTOGRAPHS**

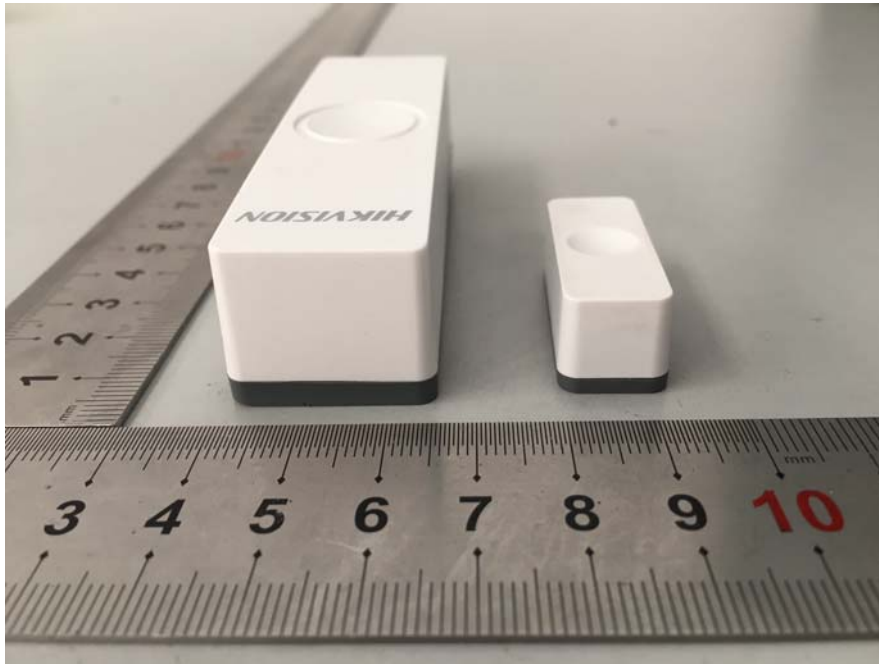
**EUT-Top View**



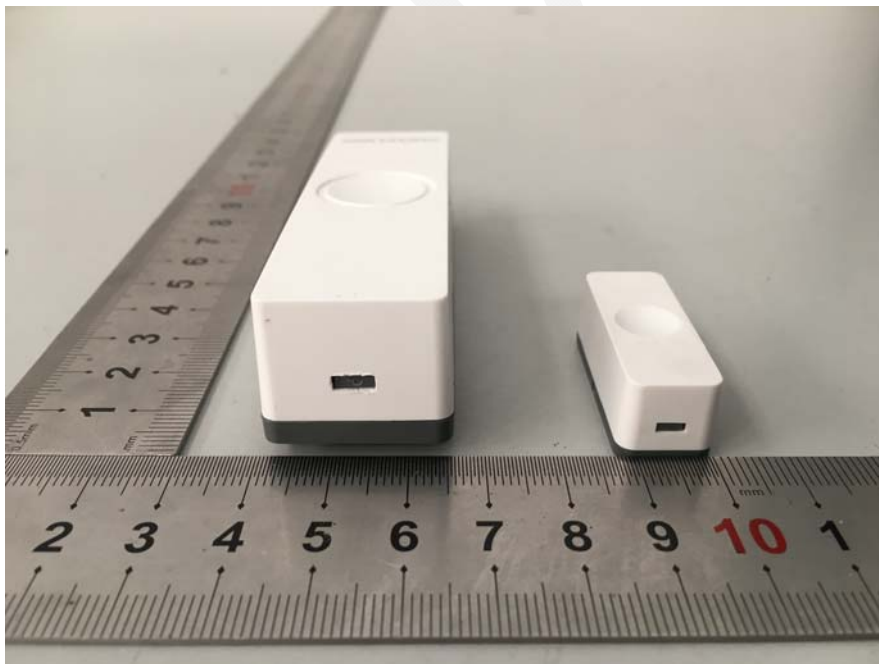
**EUT-Bottom View**



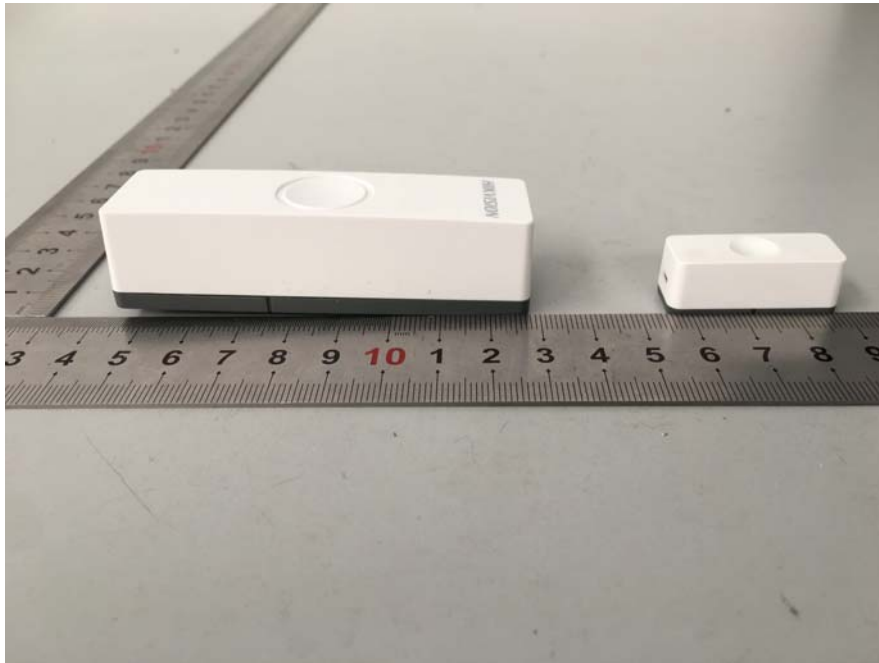
**EUT-Front View**



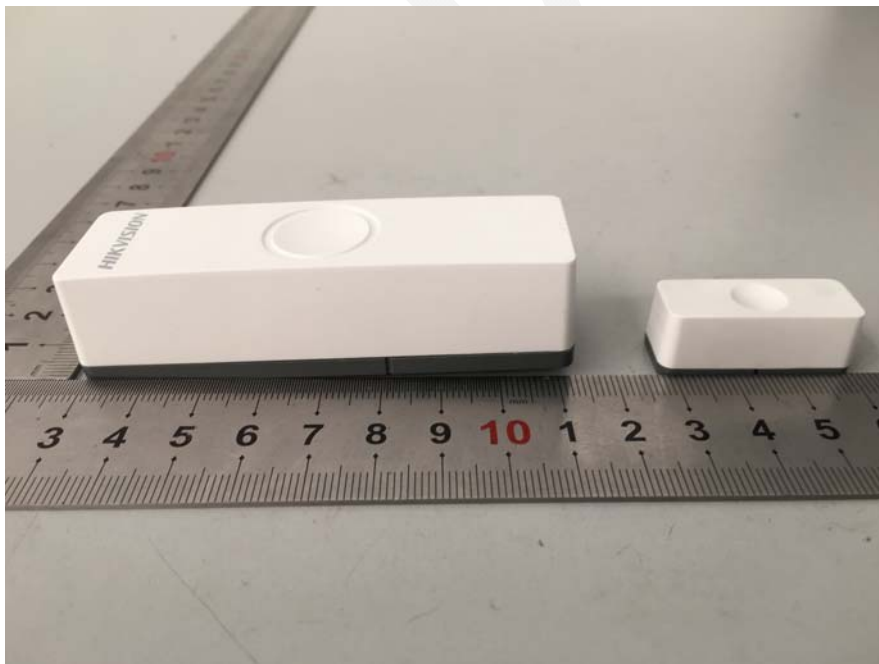
**EUT-Rear View**



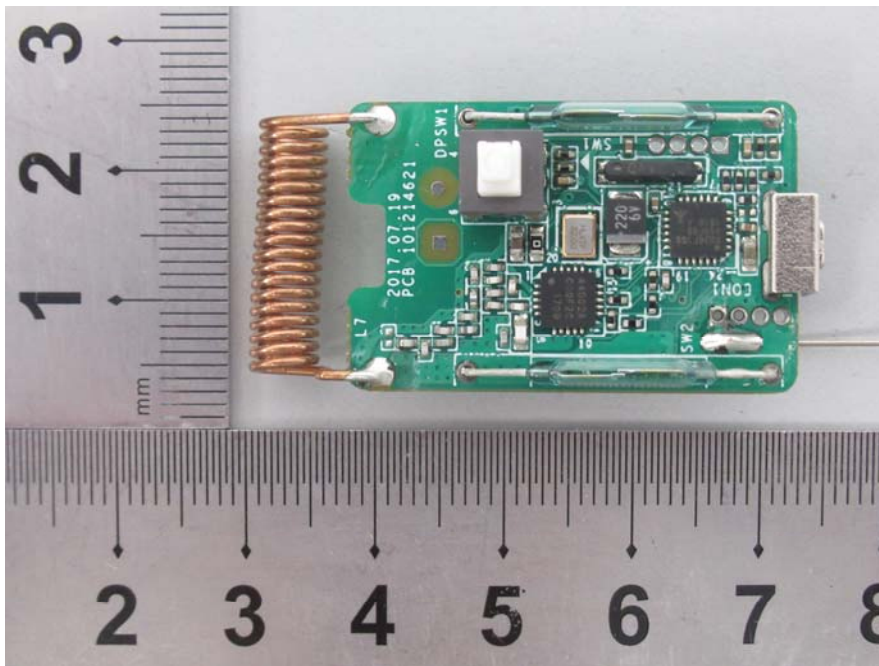
**EUT-Left View**



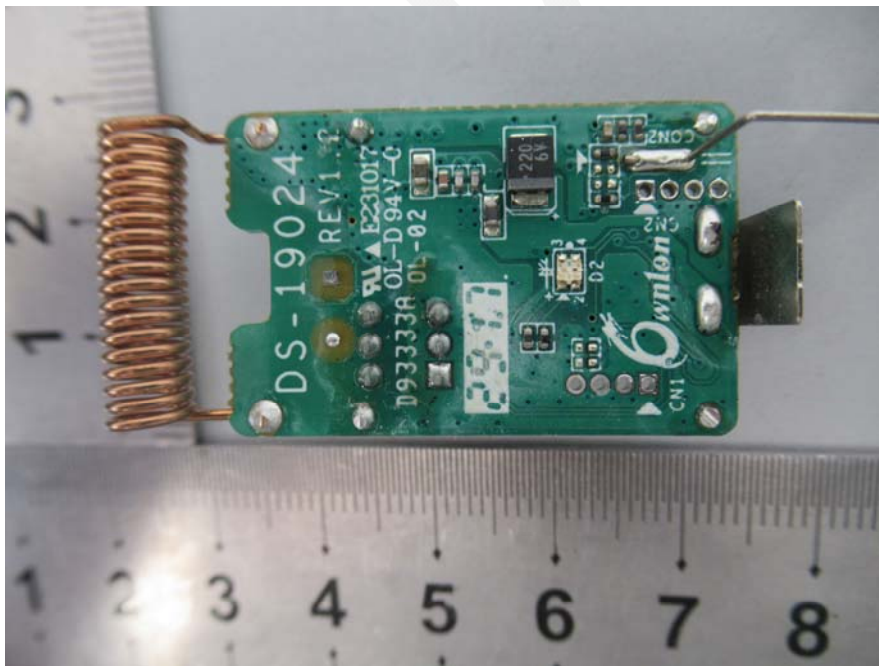
**EUT-Right View**



**EUT –PCB Top View**



**EUT –PCB Bottom View**





**EUT –Battery Top View**

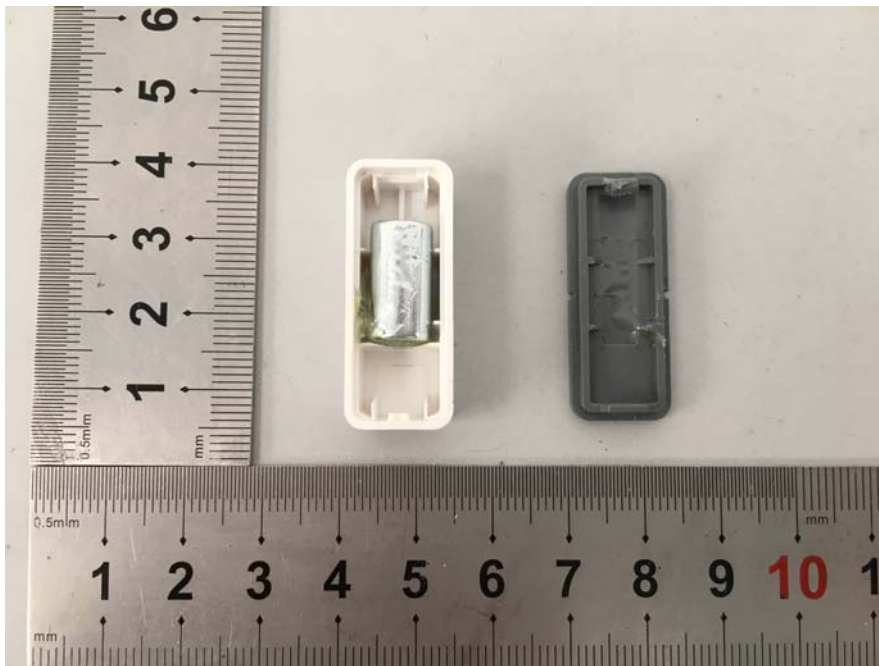


**EUT –Battery Bottom View**

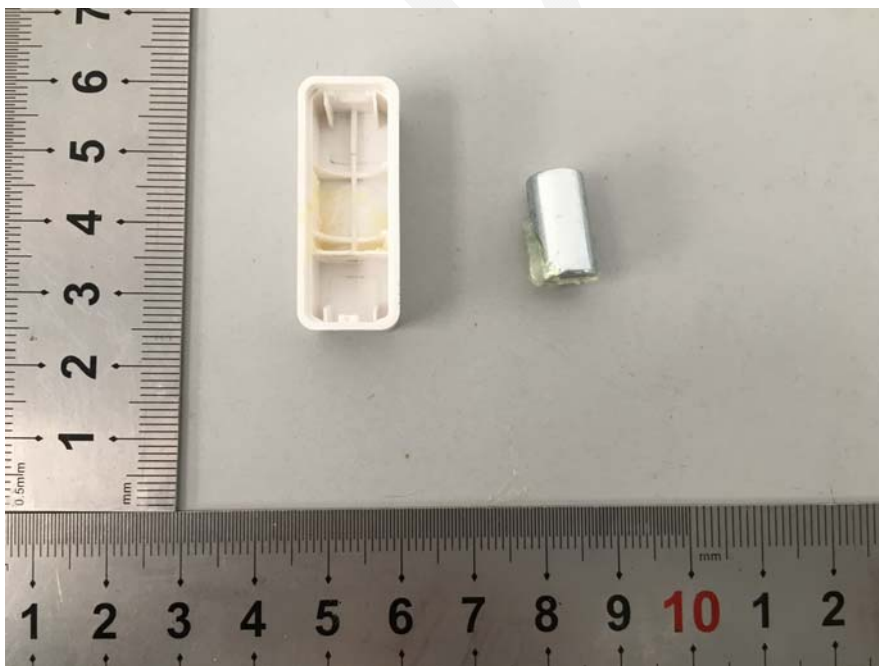




**EUT –Cover off View -3**



**EUT –Cover off View -4**

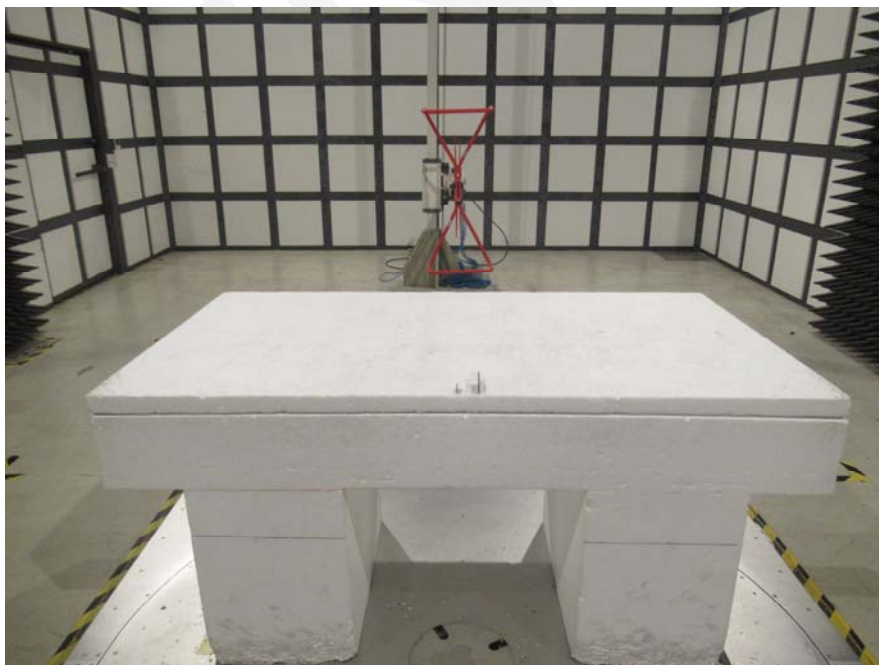


## **EXHIBIT B – TEST SETUP PHOTOGRAPHS**

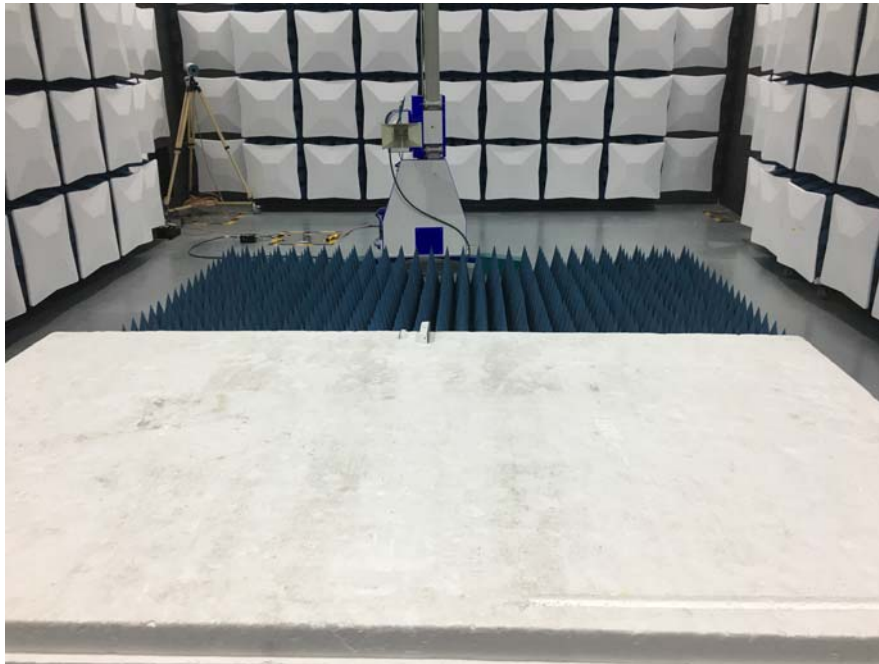
**Radiated Emissions- Front View (Below 1GHz)**



**Radiated Emissions- Rear View (Below 1GHz)**



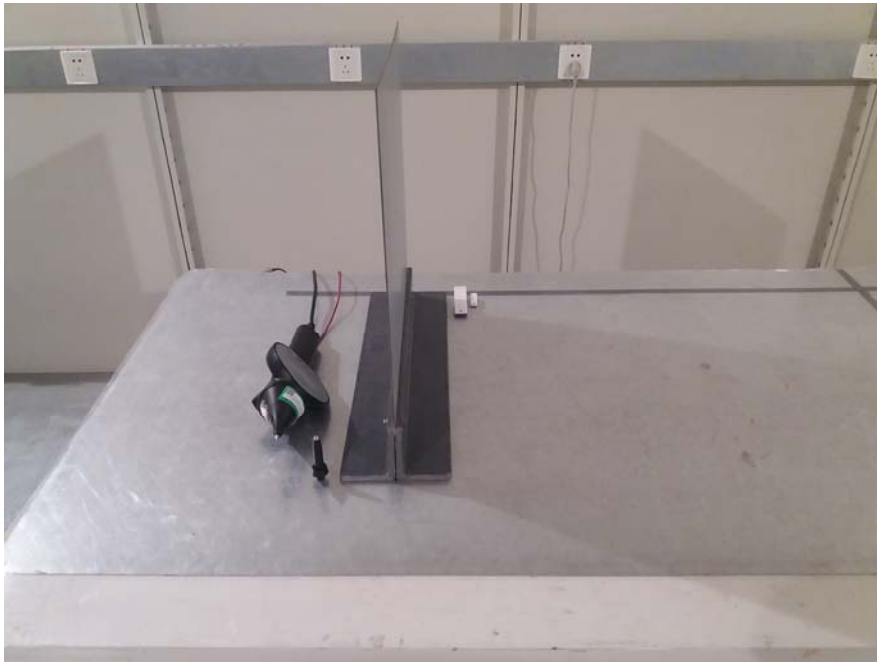
**Radiated Emissions- Front View (Above 1GHz)**



**Radiated Emissions- Rear View (Above 1GHz)**



**ESD Test Setup photo**



**RS Test Setup photo (Below 1GHz)**





**RS Test Setup photo (Above 1GHz)**



**\*\*\*\*\* END OF REPORT \*\*\*\*\***