



**TEST REPORT**  
**EN 55032**

**Electromagnetic compatibility of multimedia equipment - Emission Requirements**  
**IEC 61000-4-2: 2008**  
**Testing and measurement techniques - Electrostatic discharge immunity test**  
**IEC 61000-4-3: 2020**  
**Testing and measurement techniques - Radiated, radio-frequency, electromagnetic**  
**field immunity test**  
**IEC 61000-4-4: 2012**  
**Testing and measurement techniques - Electrical fast transient/burst immunity test**  
**IEC 61000-4-5: 2014+A1:2017**  
**Testing and measurement techniques - Surge immunity test**  
**IEC 61000-4-6: 2013**  
**Testing and measurement techniques - Immunity to conducted disturbances,**  
**induced by radio-frequency fields**  
**IEC 61000-4-9: 2016**  
**Testing and measurement techniques - Impulse magnetic field immunity test**

Report Reference No.....: **CHTE24030147**  
 Date of issue.....: Mar. 12, 2024



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**Testing Laboratory Name** .....: **Shenzhen Huatongwei International Inspection Co., Ltd.**  
**Address**.....: Building 7,Baiwang Idea Factory, No.1051,Songbai  
 Road,Yangguang Community, Xili Street, Nanshan District,  
 Shenzhen, Guangdong, China  
**Testing location/ procedure** .....: Full application of Harmonised standards   
 Partial application of Harmonised standards   
 Other standard testing methods

**Applicant's name** .....: **Readsensor-tech (shenzhen) CO., LTD**  
**Address**.....: 5/F, Building 5, LiHe Industrial Park, No.1055, SongBai Road, XiLi,  
 NanShan, ShenZhen.

**Standard** .....: **EN 55032: 2015+A11: 2020**  
**IEC 61000-4-2: 2008**  
**IEC 61000-4-3: 2020**  
**IEC 61000-4-4: 2012**  
**IEC 61000-4-5: 2014+A1:2017**  
**IEC 61000-4-6: 2013**  
**IEC 61000-4-9: 2016**

**Test Report Form No**.....: HTWEMCCE\_1B  
**TRF Originator**.....: Shenzhen Huatongwei International Inspection Co., Ltd.  
**Master TRF**.....: Dated 2014-06

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**Test item description ..... : Pressure Transducer**

Trade Mark ..... : -

Model/Type reference..... : P51-1.6MG-12(E11G-1.6M2); P53-1.6MG-12(E13G-1.6M2)

Listed Model..... : E10 Series, P50 Series

Ratings..... : See page 6-7

Result..... : **Pass**

**EMC -- TEST REPORT**

<b>Test Report No. :</b> CHTE24030147	Mar. 12, 2024 Date of issue
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Equipment under Test : **Pressure Transducer**

Type / Model : P51-1.6MG-12(E11G-1.6M2); P53-1.6MG-12(E13G-1.6M2)

Listed Model : E10 Series, P50 Series

**Applicant** : **Readsensor-tech (shenzhen) CO., LTD**

Address : 5/F, Building 5, LiHe Industrial Park, No.1055, SongBai Road, XiLi, NanShan, ShenZhen.

**Manufacturer** : **Readsensor-tech (shenzhen) CO., LTD**

Address : 5/F, Building 5, LiHe Industrial Park, No.1055, SongBai Road, XiLi, NanShan, ShenZhen.

<b>Test Result</b> according to the standards on page 4:	<b>Pass</b>
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The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# **1. TEST STANDARDS**

The tests were performed according to following standards:

[EN 55032: 2015+A11: 2020](#) Electromagnetic compatibility of multimedia equipment - Emission Requirements

[IEC 61000-4-2: 2008](#) Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

[IEC 61000-4-3: 2020](#) Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

[IEC 61000-4-4: 2012](#) Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

[IEC 61000-4-5: 2014+A1:2017](#) Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

[IEC 61000-4-6: 2013](#) Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

[IEC 61000-4-9: 2016](#) Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Impulse magnetic field immunity test

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample : Oct. 23, 2023

Testing commenced on : Oct. 23, 2023

Testing concluded on : Feb. 09, 2024

### 2.2. Equipment Under Test

Power supply voltage :  230V / 50 Hz  120V / 60Hz  
 12 V DC  24 V DC  
 Other (specified in blank below)

5V DC

### 2.3. Short description of the Equipment under Test (EUT)

The EUT is a **Pressure Transducer**

The high frequency of the EUT is below 108MHz.

Model description:

Ordering Information					
Model	Excitation		Output		
P51	5V		0.5-4.5V (Ratiometric)		
P52	8-30V		0-5V		
P53	8-30V		4-20mA		
P54	8-30V		1-5V		
P55	15-30V		0-10V		
	Code	Pressure Range	Vent Gauge	Sealed Gauge	Absolute
	7k	0-7kPa	*		
	40k	0-40kPa	*		
	100k	0-100kPa	*	*	*
	200k	0-200kPa	*	*	*
	400k	0-400kPa	*	*	*
	600k	0-600kPa	*	*	*
	1M	0-1MPa	*	*	*
	1.6M	0-1.6MPa	*	*	*
	2.5M	0-2.5MPa	*	*	*
	4M	0-4MPa	*	*	*
	XX	Others			

		Code	Pressure Mode			
		<b>G</b>	Vent Gauge			
		<b>S</b>	Sealed Gage			
		<b>A</b>	Absolute			
			Code	Pressure Port		
			<b>1</b>	1/4NPT		
			<b>2</b>	G 1/4		
			<b>3</b>	M20X1.5		
			<b>4</b>	R1/4 (old ZG1/4)		
			<b>5</b>	1/8NPT		
			<b>X</b>	Others		
				Code	Electric outlet	
				<b>1</b>	Packard connector	
				<b>2(*m)</b>	Cable (length: *meter)	
				<b>3</b>	Connector EN 175301-803 (Form A)	
				<b>4</b>	M12X1 ( 4 Core Male )	
				<b>X</b>	Others	
<b>Example:</b>						
P53	600k	A	1	2(2m)		
4-20mA	0-600kPa	absolute	1/4NPT	Cable 2 meter		Model:P53-600kA-12 (2m)

## 2.4. EUT operation mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Mode

Note:Pre-scan above all test mode, found below test mode which it was worse case mode.

Test item	Test mode (Worse case operation mode)
Conducted emission	/
Radiated emission	Mode 1
EMS	Mode 1





### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd.

Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Street, Nanshan District, Shenzhen, Guangdong, China

Phone: 86-755-26748019 Fax: 86-755-26748089

#### 3.2. Test Facility

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

##### CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01:2018 Accreditation criteria for the competence of testing and calibration laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of testing and calibration laboratories)

#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

#### 3.4. Test Description

Emission Measurement	Test standard	Test Performed	Result	EMC test parameters
Emission measurement				
Radiated Emission	EN 55032: 2015+A11: 2020 Class A	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	Emissions Class A&B
Immunity Measurement				
Electrostatic Discharge	IEC 61000-4-2: 2008	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	15KV(air)/8KV(contact)
RF Field Strength Susceptibility	IEC 61000-4-3: 2020	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	Coincidence, 10V/m, 80MHZ~1GHZ
Electrical Fast Transient/Burst Test	IEC 61000-4-4: 2012	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	Coincidence 1KV 5KHZ
Surge Test	IEC 61000-4-5: 2014+A1:2017	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	V+(O+) to V-: ±1KV/42 Ω ; Line(V+,V-,O+) to Case: ±1KV/12 Ω ;
Conducted Susceptibility Test	IEC 61000-4-6: 2013	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	150KHZ~80MHZ, 3V Level for current output models

				10V Level for voltage output models
Power Frequency Magnetic Field Susceptibility Test	IEC 61000-4-9: 2016	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PASS	100A/m Peak

### 3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission(3m)	30~1000MHz	4.52dB	(1)
Radiated Emission(10m)	30~1000MHz	4.22dB	(1)
Radiated Emission	1-18GHz	4.58dB	(1)
Conducted Disturbance (AMN)	0.15~30MHz	3.25dB	(1)
Conducted emissions(ANN)	0.15~30MHz	4.24dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3.6. Equipments Used during the Test

- Radiated Emission (3m) 30M-1GHz

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2023/4/6	2026/4/5
●	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/30	2024/8/29
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	546	2023/2/22	2026/2/21
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	/	2023/5/25	2024/5/24
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

- Electrostatic Discharge

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	ESD Simulator	EM TEST	HTWE0500	esd NX30.1	11971	2023/5/26	2024/5/25

● Radiated, radio-frequency, electromagnetic field

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Anechoic Chamber	CRT	HTWE0418	8.0*5.0*4.0m	CRTSAC845	2023/3/18	2028/3/17
●	Signal Generator	R&S	HTWE0276	SMB100A	114360	2023/5/23	2024/5/22
●	Amplifier	R&S	HTWE0277	BBA150-BC500	102664	2023/6/5	2024/6/4
●	Amplifier	R&S	HTWE0395	BBA150 D400	104197	2023/6/5	2024/6/4
●	Amplifier	R&S	HTWE0396	BBA150 E400	104198	2023/6/5	2024/6/4
●	Power Head	R&S	HTWE0278	NRP18A	101010	2023/5/23	2024/5/22
●	Power Head	R&S	HTWE0389	NRP18A	101386	2023/3/29	2024/3/28
●	Transmit Antenna	Schwarzbeck	HTWE0280	STLP9129	00044	2023/8/25	2024/8/24
●	Field Probe	ETS-LINDGREN	HTWE0321	HI-6153	00130812	2022/11/21	2023/11/22
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

● Electrical fast transient/burst immunity test

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P2125254008	2023/5/23	2024/5/22
●	3-Phase Coupling Network	EM TEST	HTWE0516	coupling NX5	P2128254484	2023/5/23	2024/5/22
●	Coupling Clamp	EM TEST	HTWE0513	CCI	P2125253835	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A

● Surge

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P2125254008	2023/5/23	2024/5/22
●	3-Phase Coupling Network	EM TEST	HTWE0516	coupling NX5	P2128254484	2023/5/23	2024/5/22
●	4-Lines Coupling Network	EM TEST	HTWE0514	DCD 5 SR-4-1	P2128254471	2023/5/23	2024/5/22
○	8-Lines Coupling Network	EM TEST	HTWE0515	DCD 5 ST-4-1	P2128254472	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A

● Conducted disturbances induced by radio-frequency fields

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal Generator	R&S	HTWE0603	SMC100A	108535	2023/5/23	2024/5/22
●	Amplifier	R&S	HTWE0606	BBA150-A125	104839	2023/5/23	2024/5/22
●	6db Attenuator	Bird	HTWE0622	150-A-FFN6	2129	2023/4/8	2024/4/7
●	Power Head	R&S	HTWE0604	NRP6AN	101713	2023/5/23	2024/5/22
●	Power Head	R&S	HTWE0605	NRP6AN	101714	2023/5/23	2024/5/22
●	CDN	EMTEST	HTWE0609	CDN M2/M3PE 16A	00083	2023/8/18	2024/8/17
●	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A
●	EM Clamp	FCC	HTWE0616	F-203I	196034	2023/5/23	2024/5/22
○	CDN	Schwarzbeck	HTWE0607	CDN-T8RJ45	00035	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0608	CDN M1 16A	00032	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0610	CDN M4PE 32A	00006	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0611	CDN M5PE 63A	00006	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0612	CDN M5 125A	00008	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0613	CDN T2	00024	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0614	CDN T4 RJ45	00003	2023/8/18	2024/8/17
○	CDN	Schwarzbeck	HTWE0615	CDN S1 BNC	00013	2023/8/18	2024/8/17
○	current clamp	FCC	HTWE0618	F-120-9A	196028	2023/5/23	2024/5/22

● Pulse Magnetic Field Immunity Test

Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Transient immunity simulator	EM TEST	HTWE0512	compact NX5	P2125254008	2023/5/23	2024/5/22
●	3-Phase Coupling Network	EM TEST	HTWE0516	coupling NX5	P2128254484	2023/5/23	2024/5/22
●	Coupling Clamp	EM TEST	HTWE0513	CCI	P2125253835	2023/5/23	2024/5/22
●	Test Software	EM TEST	N/A	ISM IEC	N/A	N/A	N/A
●	Current Transformer	EM TEST	HTWE0009	MC2630	D5101	2023/8/18	2024/8/17
●	Magnetic Coil	EM TEST	HTWE0010	MS100	0500-19	2023/8/18	2024/8/17

## 4. TEST CONDITIONS AND RESULTS

### 4.1. Radiated Emission

For test instruments and accessories used see section 3.6.

#### 4.1.1. Description of the test location

Test location: SAC1

Date of test: Oct. 25, 2023

Operator: CHUANFENG LI

#### 4.1.2. Limits of disturbance (Class A&B)

Limits below 1GHz

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

#### 4.1.3. Description of the test set-up

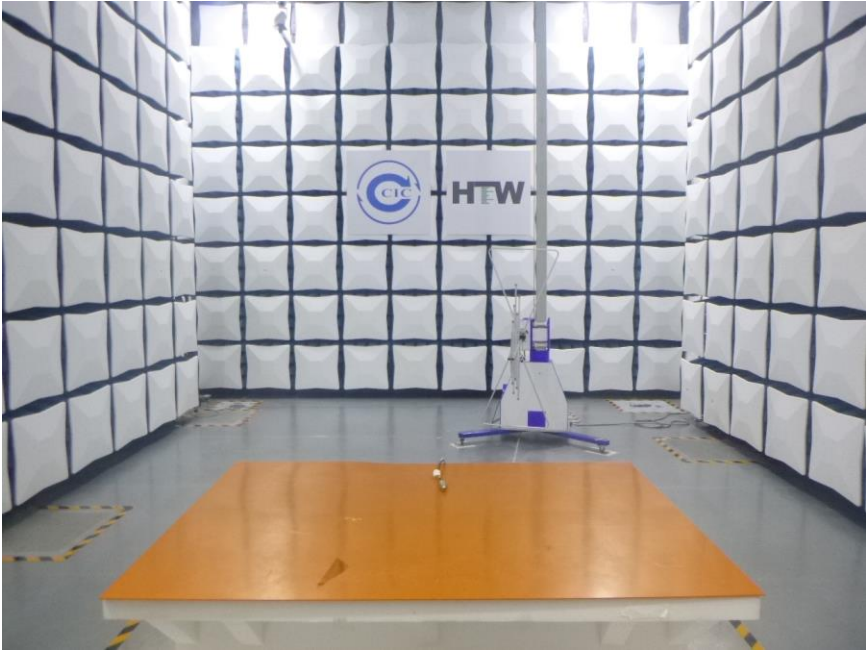
##### 4.1.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

##### 4.1.3.2. Test Configuration and Procedure

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table which is 0.8 meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 meters away from the center of receiving antenna, and the antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.1.3.3. Photos of the test set-up



#### 4.1.4. Test result

The requirements are **Fulfilled**

Band Width: 120kHz

Frequency Range: 30MHz to 1000MHz

**Remarks:** The limits are kept. For detailed results, please see the following page(s).

Margin=limit-level

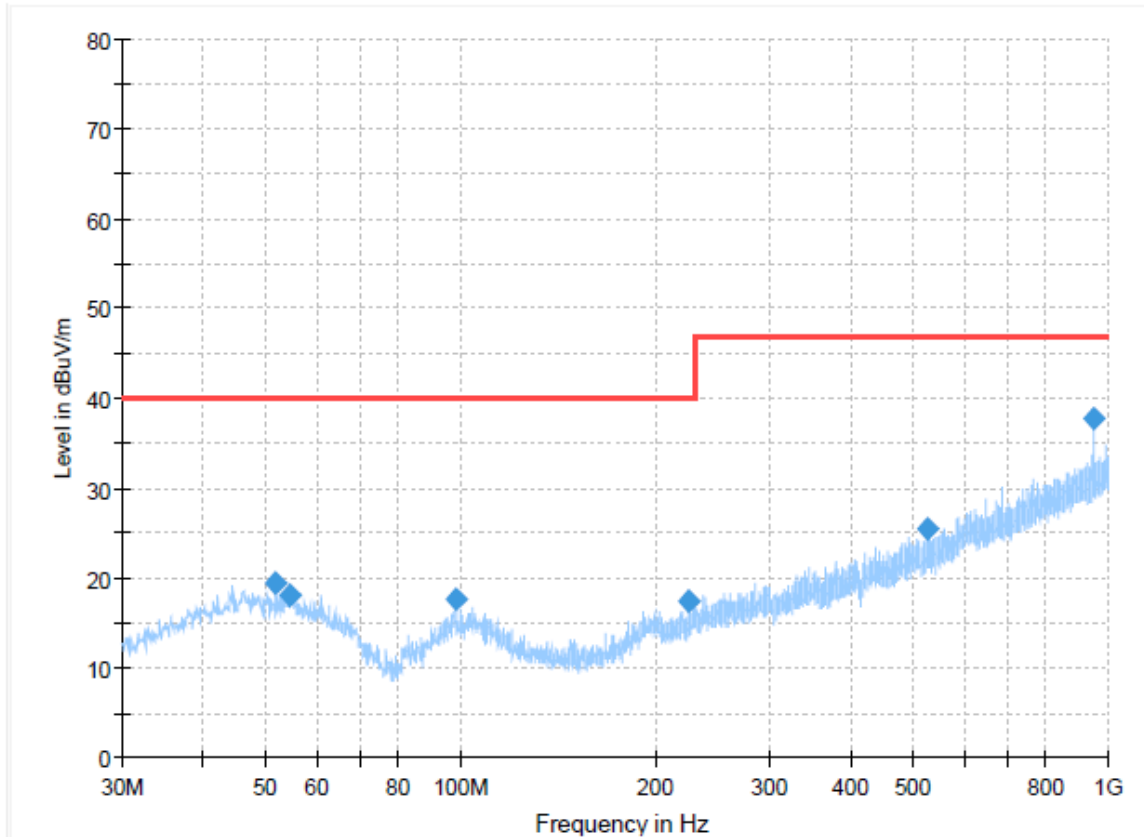
Level=read values+transducer

Transducer=antenna factor+pre-amplifier factor+cable loss



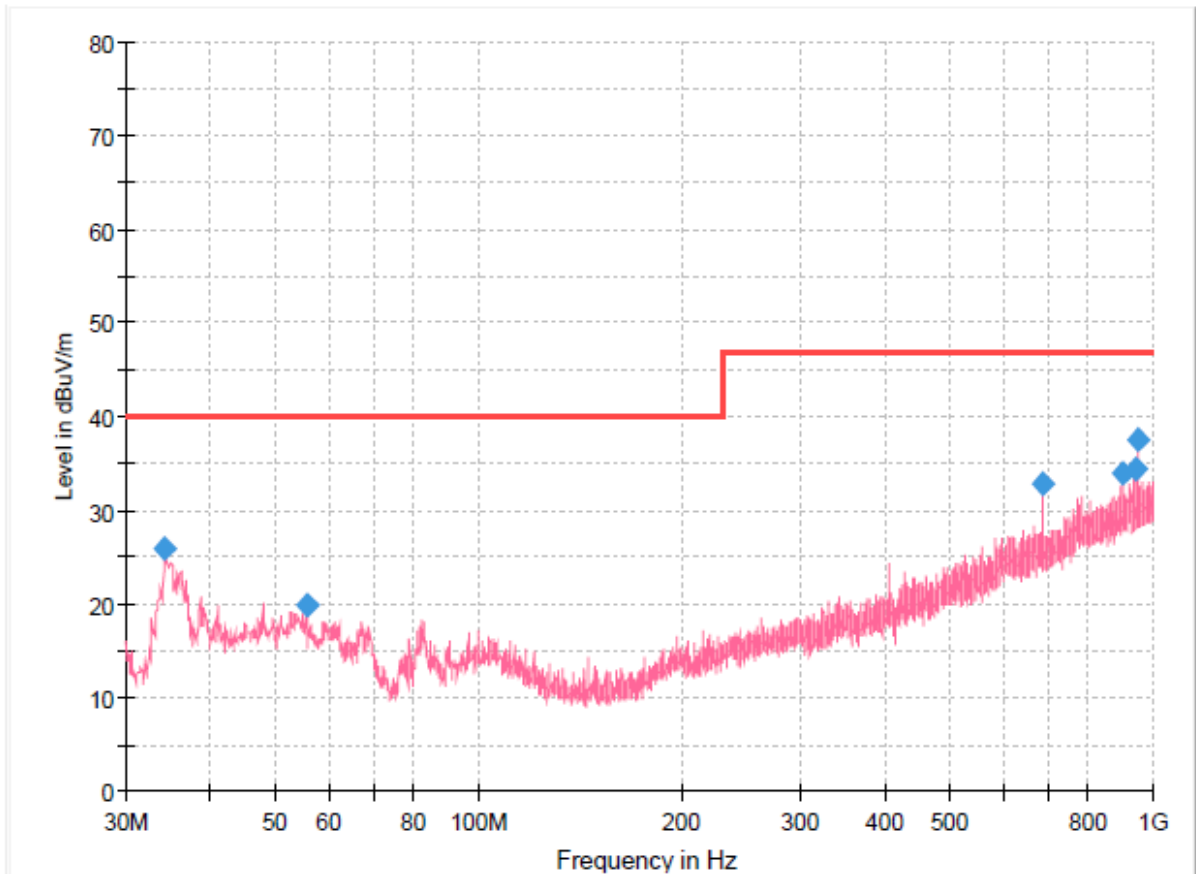
Below 1G

Model: P51-1.6MG-12



### Final Result

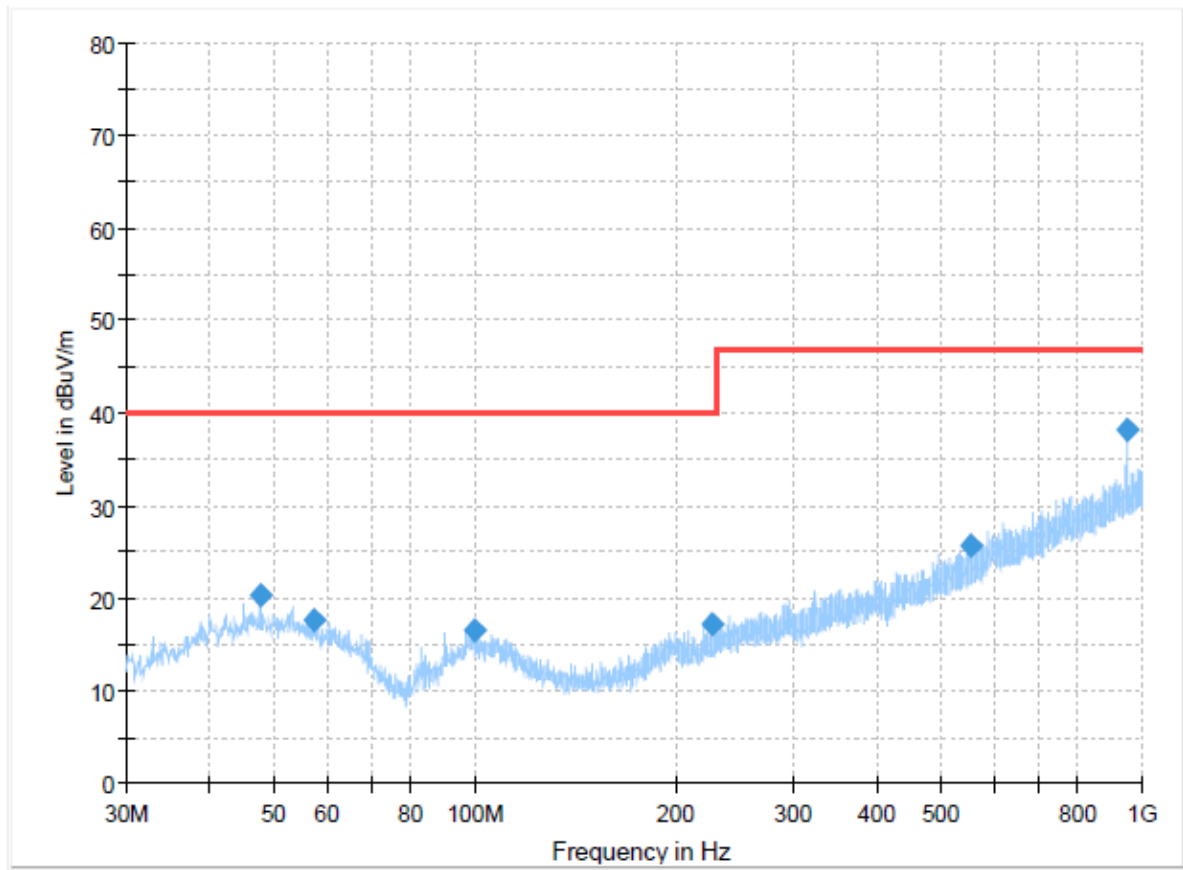
Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.8250	19.42	40.00	20.58	300.0	H	2.0	-8.8
54.6138	18.10	40.00	21.91	300.0	H	183.0	-9.1
98.6275	17.75	40.00	22.25	300.0	H	270.0	-10.9
225.2125	17.45	40.00	22.55	300.0	H	0.0	-10.2
525.5488	25.38	47.00	21.62	300.0	H	175.0	-1.7
948.4688	37.83	47.00	9.17	300.0	H	349.0	7.1



### Final Result

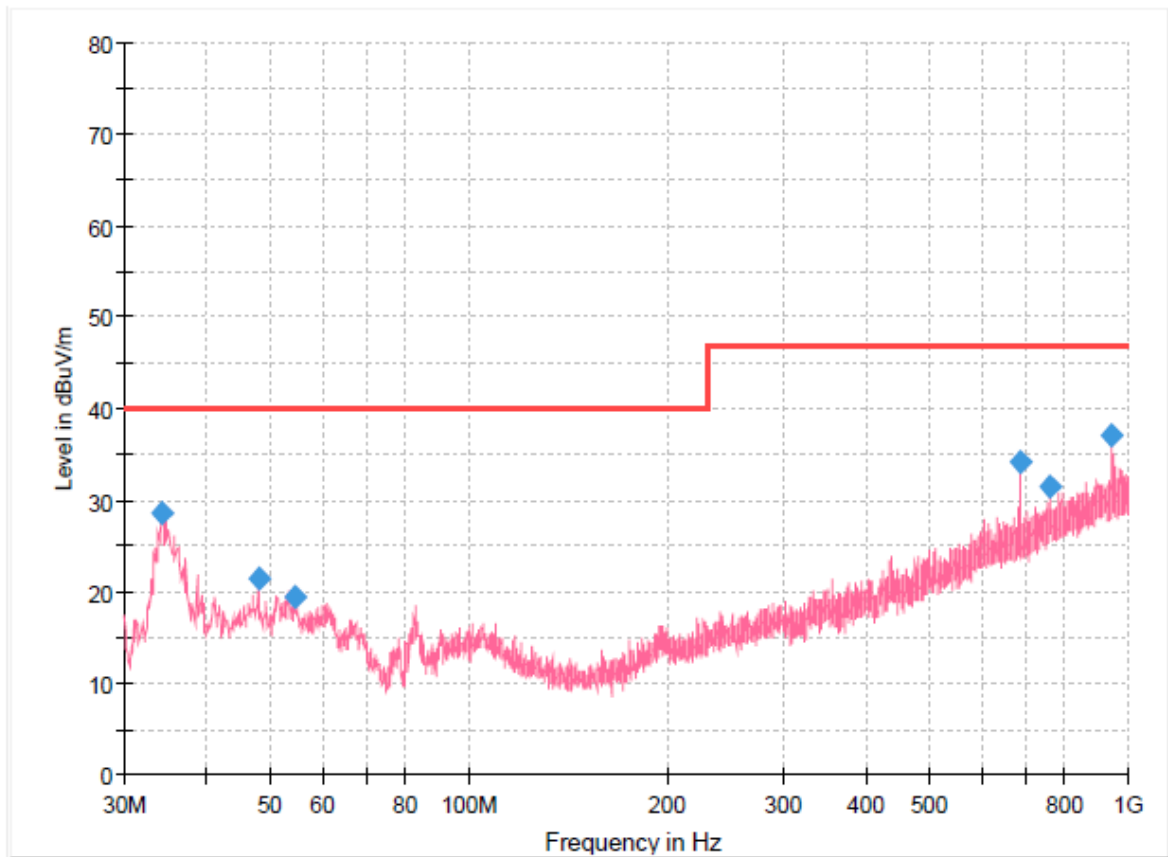
Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.3650	25.92	40.00	14.08	100.0	V	225.0	-12.0
55.5838	19.87	40.00	20.13	100.0	V	323.0	-9.1
687.5388	32.85	47.00	14.15	100.0	V	38.0	2.1
904.3338	33.97	47.00	13.03	100.0	V	201.0	6.8
945.1950	34.52	47.00	12.48	100.0	V	139.0	7.1
948.4688	37.49	47.00	9.51	100.0	V	69.0	7.1

Model: P53-1.6MG-12



### Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
47.7025	20.24	40.00	19.76	100.0	H	53.0	-8.8
57.6450	17.61	40.00	22.39	300.0	H	55.0	-9.4
100.0825	16.52	40.00	23.48	100.0	H	208.0	-10.7
227.2738	17.32	40.00	22.68	100.0	H	166.0	-10.1
553.9213	25.71	47.00	21.29	100.0	H	166.0	-0.8
948.4688	38.25	47.00	8.75	300.0	H	306.0	7.1



### Final Result

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.3650	28.63	40.00	11.37	100.0	V	102.0	-12.0
47.9450	21.49	40.00	18.51	100.0	V	318.0	-8.8
54.4925	19.53	40.00	20.47	100.0	V	40.0	-9.1
687.5388	34.29	47.00	12.71	100.0	V	318.0	2.1
761.5013	31.41	47.00	15.59	100.0	V	29.0	3.9
945.1950	37.10	47.00	9.90	100.0	V	318.0	7.1

## 4.2. Electrostatic discharge

For test instruments and accessories used see section 3.6.

### 4.2.1. Description of the test location and date

Test location: Shielded room No. 4

Date of test: Oct. 27, 2023

Operator: Jian Li

### 4.2.2. Severity levels of electrostatic discharge

4.2.2.1. Severity level: Contact Discharge at  $\pm 8\text{KV}$  Air Discharge at  $\pm 15\text{KV}$

Level	Test Voltage	Test Voltage
	Contact Discharge (KV)	Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.2.2.2. Performance criterion: **B**

### 4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

4.2.3.2. Test Configuration and Procedure:

Direct Discharge:

Air Discharge:

— This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator 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 air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 25 times for each pre-selected test point.

Indirect Discharge:

— The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.

— The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to nce criterion.

4.2.3.3. Photo of the test set-up



4.2.4. Test specification:

- Contact discharge voltage:  8 kV
- Number of discharges:  10  25
- Air discharge voltage (B):  15 kV
- Number of discharges:  10  25
- Type of discharge:
  - Direct discharge  Air discharge
  - Contact discharge
  - Indirect discharge  Contact discharge
- Polarity:  Positive  Negative
- Discharge location:
  - air discharge----  
key buttons, Gaps of enclosure,screen
  - conduct discharge---  
metallic connector
  - Horizontal coupling plane (HCP)
  - vertical coupling plane (VCP)

4.2.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:** After the test, the selected operation mode had no exception within the standard range.

### 4.3. Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

#### 4.3.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Oct. 27, 2023

Operator: Jian Li

#### 4.3.2. Severity levels of electrical fast transients / Burst

4.3.2.1. Severity level:  $\pm 1000V$  for Signal lines

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O signal, data and control ports	
	V peak(KV)	Repetition rate (KHz)	Voltage peak	Repetition rate (KHz)
1.	0.5	5 or 100	0.25	5 or 100
2.	1	5 or 100	0.5	5 or 100
3.	2	5 or 100	1	5 or 100
4.	4	5 or 100	2	5 or 100
X	Special	Special	Special	Special

4.3.2.2. Performance criterion: **A**

#### 4.3.3. Description of the test set-up

##### 4.3.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

##### 4.3.3.2. Test Requirements

EUT and its simulators shall be placed 0.1m high above the ground reference plane which is a minimum 1m\*1m with minimum 0.65mm thickness. 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.

##### 4.3.3.3. Test Configuration and Procedure

For AC power input lines:

—EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

For Signal Line Line:

—Coupling clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. The signal lines and control lines of EUT are put through the coupling clamp which couples the EFT signal to these lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.3.3.4. Photo of the test set-up

Model: P51-1.6MG-12



Model: P53-1.6MG-12





**4.3.4. Test specification:**

Coupling network:  0.5 kV  1 kV  2 kV  4 kV

Coupling clamp:  0.5 kV  1 kV

Burst frequency:  5.0 kHz

Coupling duration:  60 s

Polarity:  positive  negative

**4.3.5. Coupling points**

Cable description: Signal line

---

Screening:  screened  unscreened

Status:  passive  active

Signal transmission:  analogue  digital

Length:  /

**4.3.6. Test result**

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test, the selected operation mode had no exception within the standard range.

#### 4.4. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

##### 4.4.1. Description of the test location and date

Test location: Shielded room No. 7

Date of test: Oct. 25, 2023

Operator: Jianjun, Liang

##### 4.4.2. Severity levels of radiated, radio-frequency, electromagnetic field

4.4.2.1. Severity level: 10 V/m

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

4.4.2.2. Performance criterion: **A**

##### 4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

4.4.3.2. Test Configuration and Procedure

EUT is placed on a table which is 0.8 meter above ground. The center of the transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

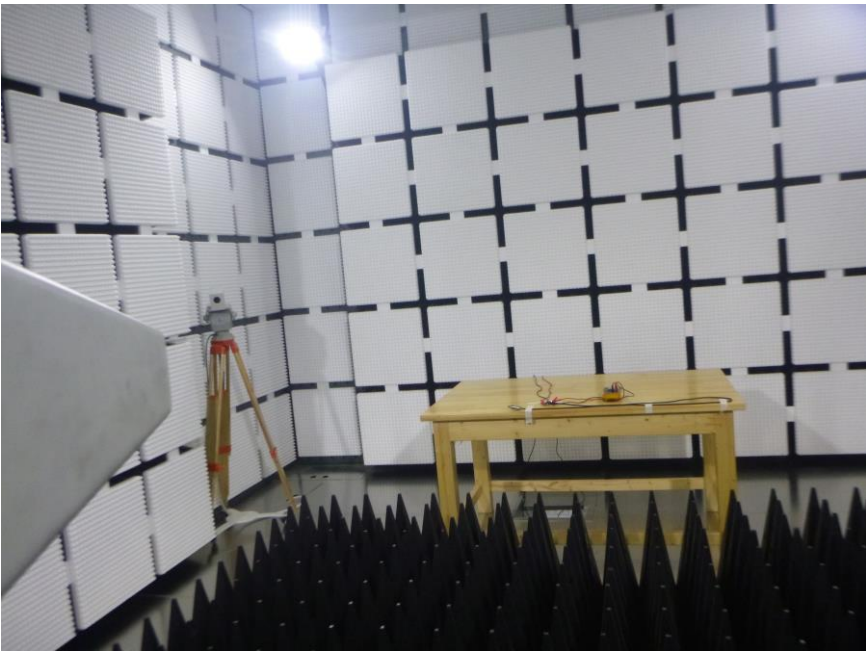
Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.4.3.3. Photo of the test set-up

Model: P51-1.6MG-12



Model: P53-1.6MG-12



**4.4.4. Test specification:**

<u>Frequency range:</u>	■ 80 MHz to 1000 MHz
<u>Field strength:</u>	■ 10 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000Hz
<u>Frequency step:</u>	■ 1 % with 1 s dwell time
<u>Antenna polarisation:</u>	■ horizontal                      ■ vertical

**4.4.5. Test result**The requirements are **Fulfilled**Performance Criterion: **A****Remarks:** During the test, the selected operation mode had no exception within the standard range.

## 4.5. Surge

For test instruments and accessories used see section 3.6.

### 4.5.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Feb. 05, 2024

Operator: Jian Li

### 4.5.2. Severity levels of surge

4.5.2.1. Severity level: Signal:  $V+(O+)$  to  $V-: \pm 1KV/42 \Omega$  ;  
Line( $V+,V-,O+$ ) to Case:  $\pm 1KV/12 \Omega$  ;

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

### 4.5.3. Description of the test set-up

#### 4.5.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

#### 4.5.3.2. Test Configuration and Procedure

For AC power ports:

In this test, the 1.2/50us & 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is 1 time more than that for line to line. At least 5 positive and 5 negative (polarity) surge signal with a maximum 1/min repetition rate are injected to AC power lines from 4 different phase angle(  $0^\circ, 90^\circ, 180^\circ, 270^\circ$ ) during the test.

For signal ports:

In this test, the 10/700us surge generator must be used for signal ports. The voltage for line to earth coupling mode is 1 time more than that for line to line. At least 5 positive and 5 negative (polarity) surge signal with a maximum 1/min repetition rate are injected to signal lines during the test.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.5.3.3. Photo of the test set-up

Model: P51-1.6MG-12



Model: P53-1.6MG-12



#### 4.5.4. Test specification:

Signal line: 8/20us  
Source impedance:42Ω

0.5 kV     1 kV

Signal line: 8/20us  
Source impedance:12Ω

0.5 kV     1 kV

Phase angle:

0 °     90 °     180 °     270 °

Repetition rate:

60 s

Polarity:

positive                       negative

#### 4.5.5. Coupling points

Cable description:

Signal line

---

Screening:

screened                       unscreened

Status:

passive                       active

Signal transmission:

analogue                       digital

Length:

/

#### 4.5.6. Test result

The requirements are **Fulfilled**

Performance Criterion: Criterion B

**Remarks:**    After the test, the selected operation mode had no exception within the standard range.

## 4.6. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

### 4.6.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Oct. 27, 2023

Operator: Junxun Lin

### 4.6.2. Severity levels of conducted disturbances induced by radio-frequency fields discharge

4.6.2.1. Severity Level: 3V Level for current output model P53-1.6MG-12  
10V Level for voltage output model P51-1.6MG-12

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

4.6.2.2. Performance Criterion: **A**

### 4.6.3. Description of the test set-up

#### 4.6.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

#### 4.6.3.2. Test Configuration and Procedure

For AC power port:

EUT is placed on an insulating support of 0.1m high above a ground reference plane. It must be 0.3m away the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. 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). The disturbance signal amplified by amplifier is injected to EUT through CDN.

For signal ports:

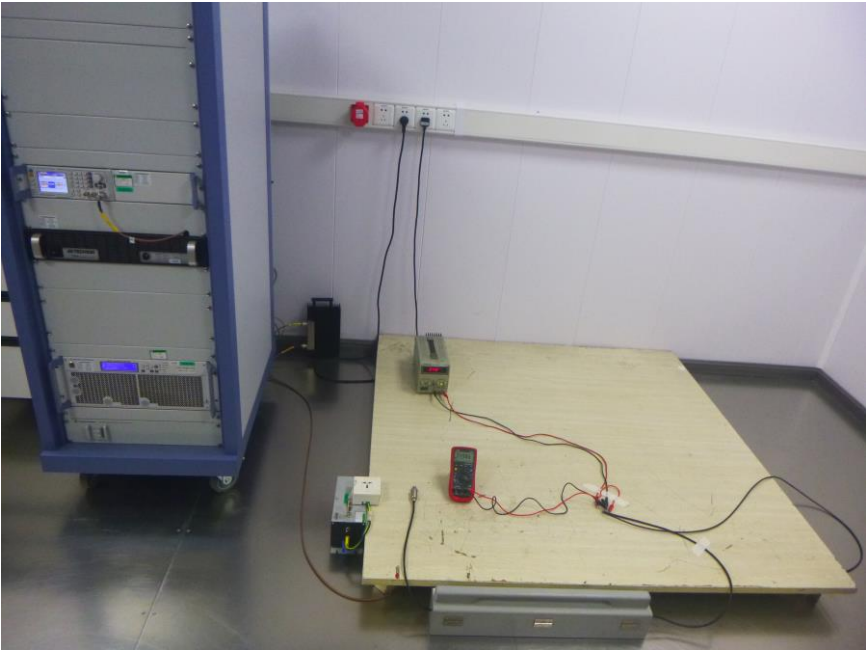
EUT is placed on an insulating support of 0.1m high above a ground reference plane. The EM clamp is directly placed on the ground reference plane with its metallic bottom contacting the plane. Cables between EUT and auxiliary equipment are put through the EM clamp. The disturbance signal amplified by amplifier is injected to EUT through EM clamp.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

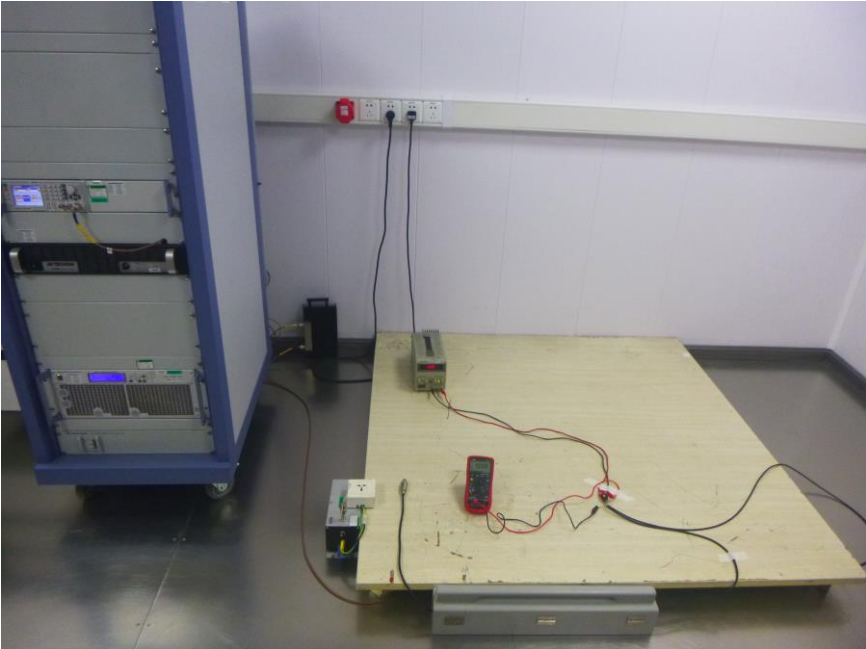


4.6.3.3. Photo of the test set-up

Model: P51-1.6MG-12



Model: P53-1.6MG-12



#### 4.6.4. Test specification:

Frequency range:  0.15 MHz to 80 MHz

Test voltage(For voltage output model P51-1.6MG-12)  10 V

Test voltage(For current output model P53-1.6MG-12)  3 V

Modulation:  AM: 80 %  
 sinusoidal 1000Hz

Frequency step:  1 % with 1 s dwell time

#### 4.6.5. Coupling points

Cable description :

Signal line

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Screening:	<input type="checkbox"/> screened	<input checked="" type="checkbox"/> unscreened
Status:	<input type="checkbox"/> passive	<input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue	<input type="checkbox"/> digital
Length:	<input checked="" type="checkbox"/> /	

#### 4.6.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test, the selected operation mode had no exception within the standard range.

## 4.7. Pulse Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

### 4.7.1. Description of the test location and date

Test location: Shielded room No. 8

Date of test: Oct. 27, 2023

Operator: Junxun Lin

### 4.7.2. Severity levels of magnetic field immunity

4.7.2.1. Severity Level: 100A/m

Level	Pulse Magnetic Field Strength (A/m)
1	n.a
2	n.a
3	100
4	300
5	1000
X	Special

### 4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT tested system was configured as the statements of 2.4 chapter, and the results of the maximum emanation are recorded.

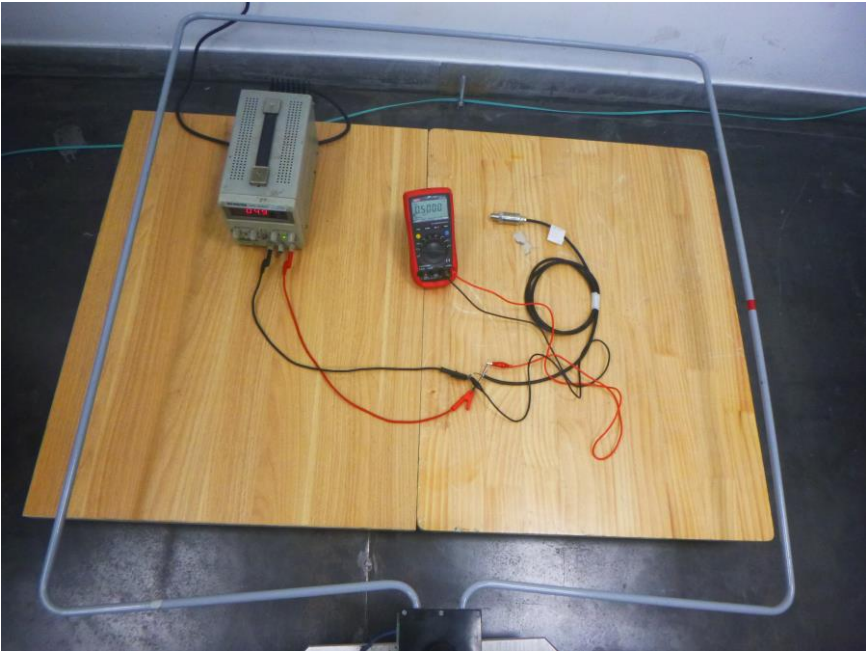
4.7.3.2. Test Procedure:

EUT is placed on an insulated support of 0.1m high above a table of 0.8m high. There is a minimum 1m×1m ground metallic plane put on this table. EUT is put in the center of the magnetic coil then two orientations of the magnetic coil, horizontal and vertical, shall be rotated in order to expose the EUT to magnetic fields of different polarization.

Record any performance degradation of the EUT during the test, judge the test result according to performance criterion.

4.7.3.3. Photo of the test set-up

Model: P51-1.6MG-12



Model: P53-1.6MG-12



**4.7.4. Test specification:**

<u>Continuous field:</u>	■ 100A/m
<u>Pulse generator:</u>	■ 6.4/16us
<u>Polarity:</u>	■ Positive and negative
<u>Phase relationship with the power frequency:</u>	■ Synchronizable from 0 to 360 phase with 10 phase

**4.7.5. Test result**

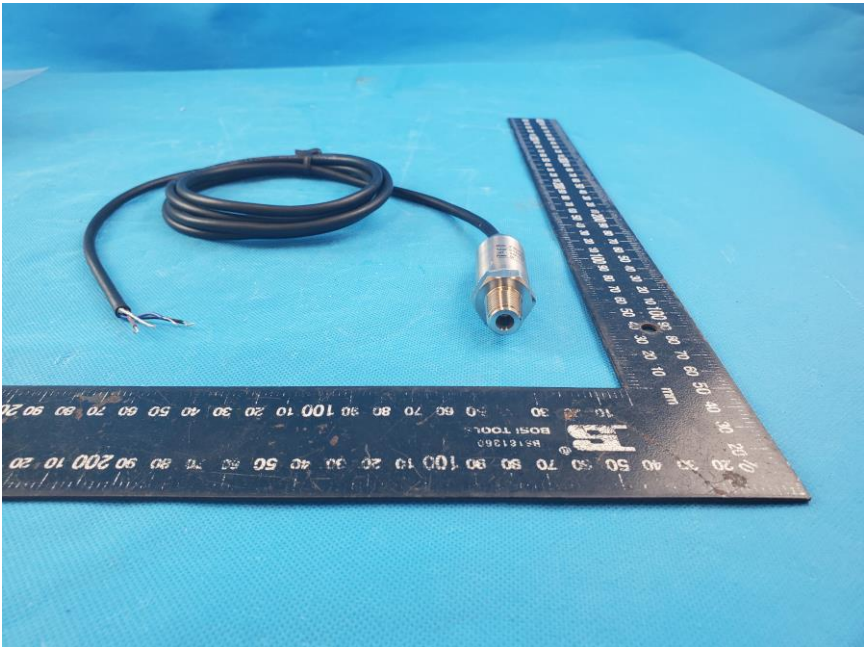
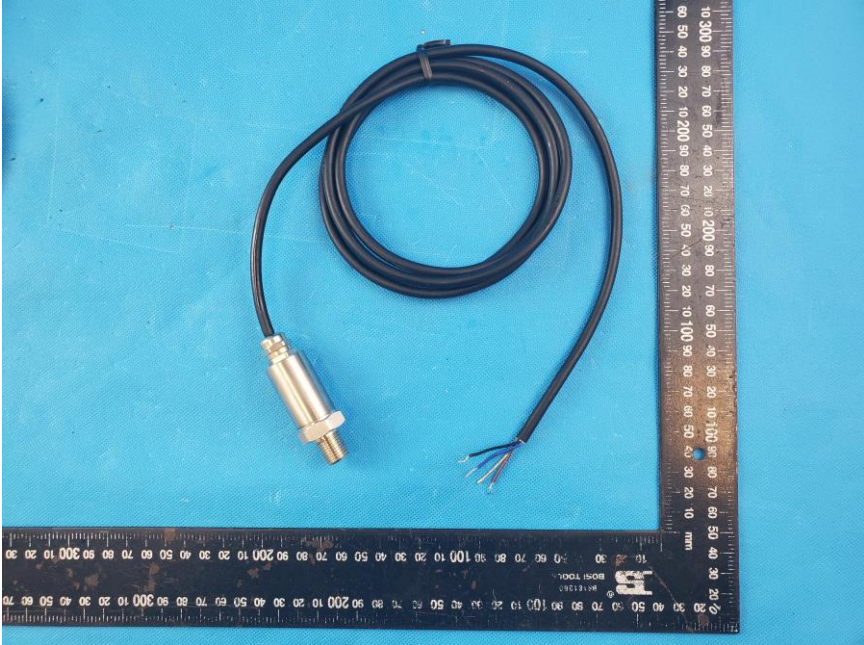
The requirements are **Fulfilled**

Performance Criterion: **A**

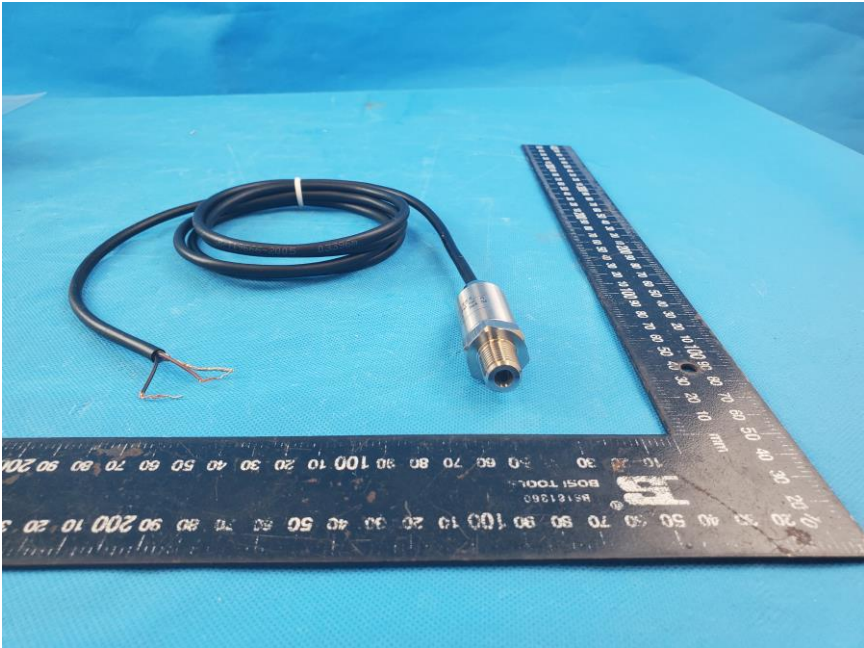
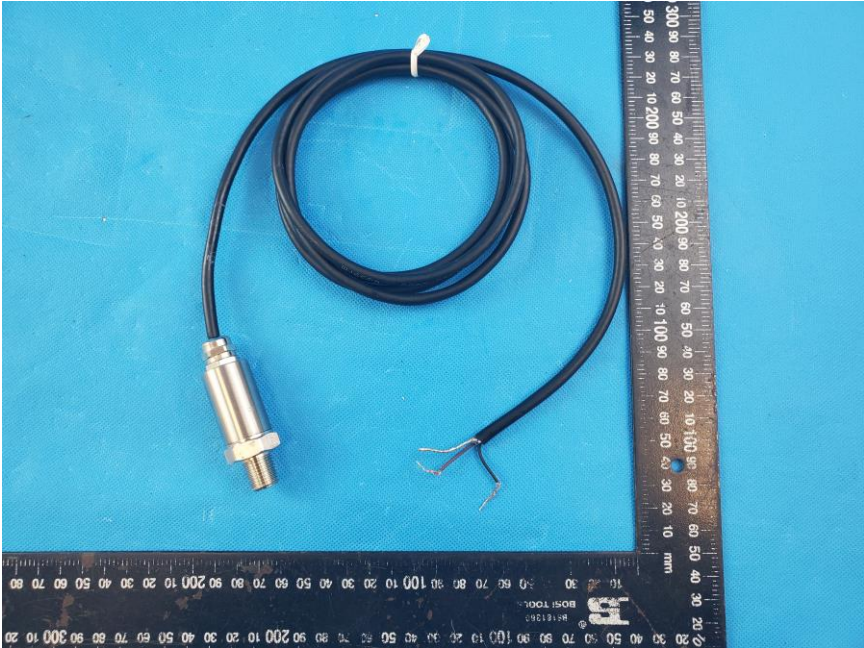
**Remarks:** During the test, the selected operation mode had no exception within the standard range.

### 5. Photos of the EUT

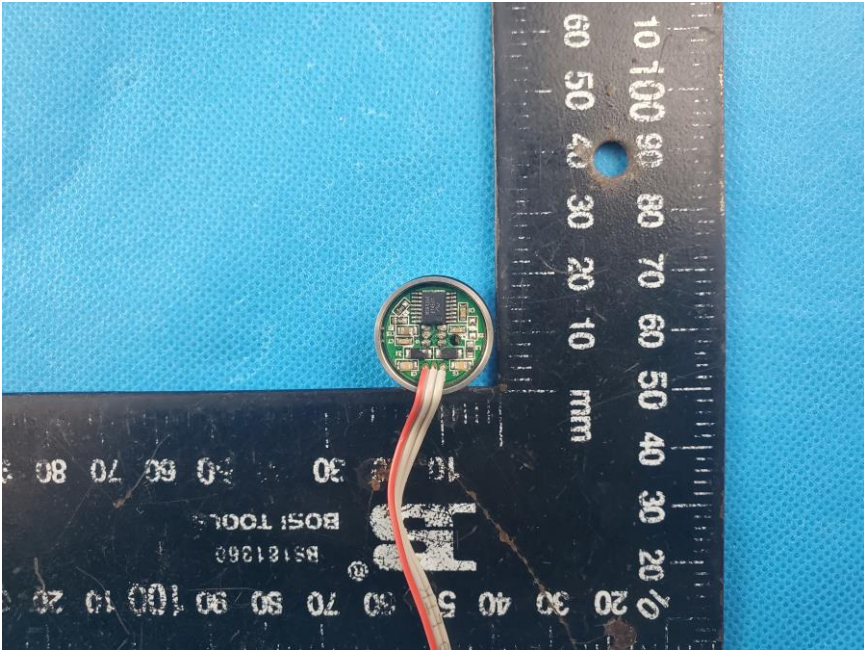
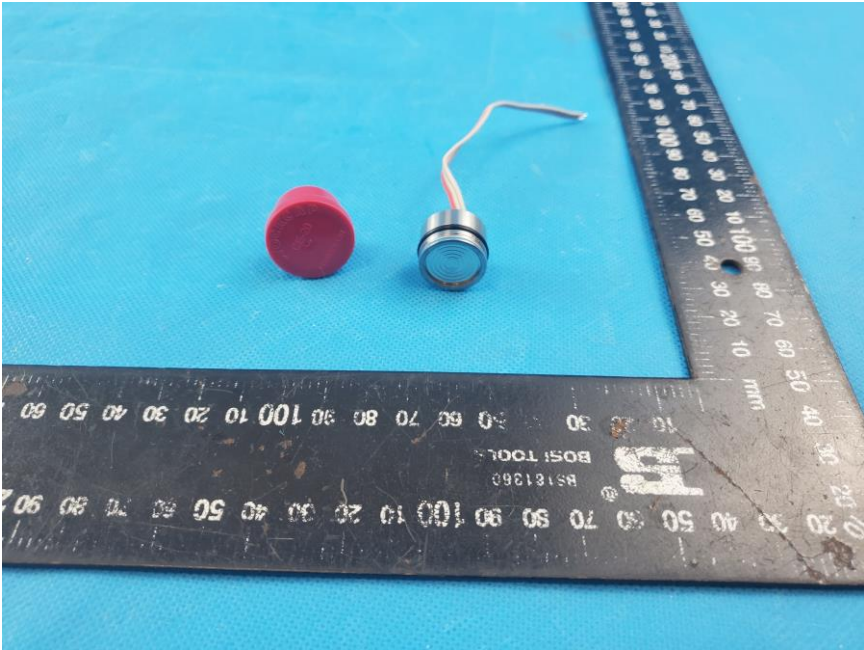
Model: P51-1.6MG-12



Model: P53-1.6MG-12

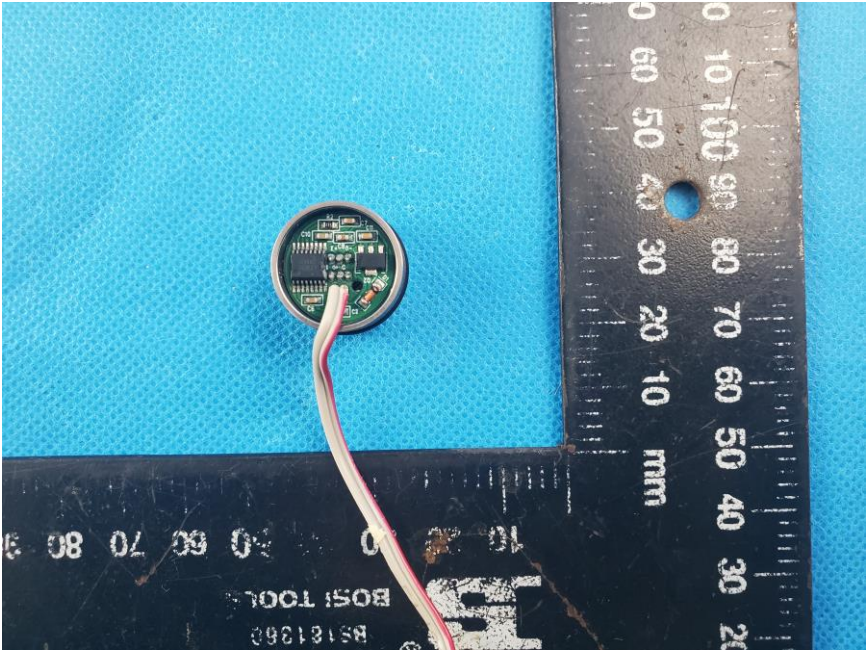
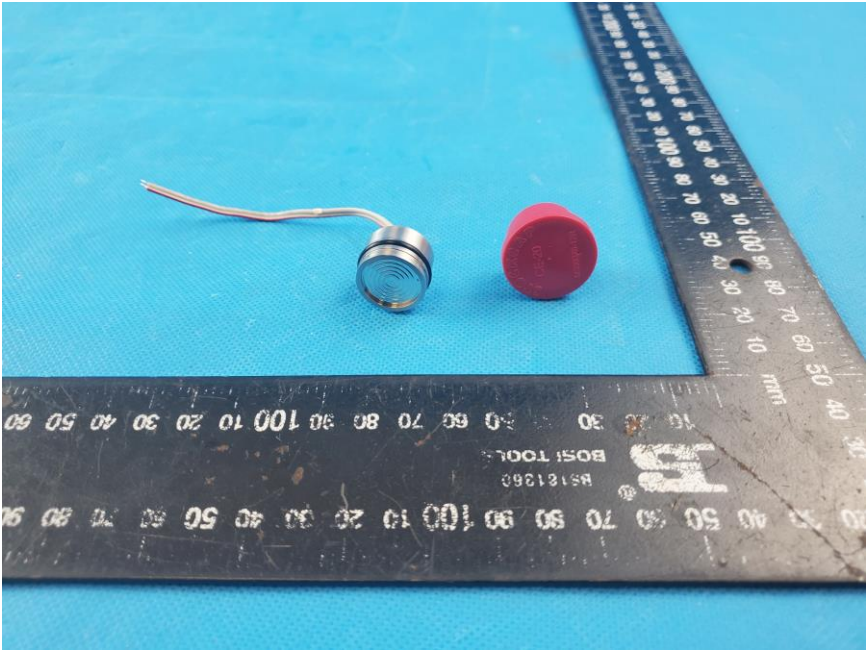


Model: E11G-1.6M2





Model: E13G-1.6M2



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