



SHENZHEN HUATONGWEI INTERNATIONAL INSPECTION Co., Ltd.

## Test Verification of Conformity

Certificate No.: CTE18050081

R/C: 55073

Issued Date: May. 29, 2018

In accordance with the following Applicable Directives:

**2014/30/EU**

**Electromagnetic Compatibility**

The equipment, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of:

**EN 61326-1: 2013**

The test results are traceable to the international or national standards.

**Applicant:** SHANGHAI PINYAN M&C TECHNOLOGY CO., LTD.

Unit 55, No.2155, Lianhua south Road, Minhang District, Shanghai, China

**Manufacturer:** SHANGHAI PINYAN M&C TECHNOLOGY CO., LTD.

Unit 55, No.2155, Lianhua south Road, Minhang District, Shanghai, China

**EUT Name:** Power meter

**Model number:** ME437

**Listed Model(s):** ME631, ME232, ME531, ME432

**Laboratory:** Shenzhen Huatongwei International Inspection Co., Ltd.

Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, Guangdong, China  
Tel: 86-755-26748078 Fax: 86-755-26748089  
Http: //www.szhtw.com.cn E-mail: cs@szhtw.com.cn



**Note:**

The certification is only valid for the equipment and configuration described, in conjunction with the test data detailed above.  
The CE mark as shown beside can be used, under the responsibility of the manufacturer, after completion of an EC Directive of Conformity and compliance with all relevant EC Directive.

For and on behalf of  
Shenzhen Huatongwei International Inspection Co., Ltd.

Authorized by:





## TEST REPORT

EN 61326-1

### Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

Report Reference No.: TRE18050081 R/C: 55073

Tested by

(printed name+signature): Kevin Yang

*Kevin Yang*

Supervised by

(printed name+signature): Stellar Xu

*Stellar Xu*

Approved by

(printed name+signature): Tony Jiang

*Tony Jiang*

Date of issue: May. 29, 2018

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, Guangdong, China

Testing location/ procedure: Full application of Harmonised standards ☒  
Partial application of Harmonised standards ☐  
Other standard testing methods ☐

Applicant's name: SHANGHAI PINYAN M&C TECHNOLOGY CO., LTD.

Address: Unit 55, No.2155, Lianhua south Road, Minhang District, Shanghai, China

Standard: EN 61326-1: 2013

Non-standard test method: N/A

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: Power meter

Trade Mark: -

Model/Type reference: ME437

Listed Models: ME631, ME232, ME531, ME432

Ratings: AC/DC 85V-265V

Result: Positive

**EMC -- T E S T R E P O R T**

<b>Test Report No. :</b>	<b>TRE18050081</b>	May. 29, 2018
		Date of issue

Equipment under Test : **Power meter**

Model / Type : ME437

Listed Models : ME631, ME232, ME531, ME432

**Applicant** : **SHANGHAI PINYAN M&C TECHNOLOGY CO., LTD.**

Address : Unit 55, No.2155, Lianhua south Road, Minhang District,  
Shanghai, China

**Manufacturer** : **SHANGHAI PINYAN M&C TECHNOLOGY CO., LTD.**

Address 1 : Unit 55, No.2155, Lianhua south Road, Minhang District,  
Shanghai, China

<b>Test Result</b> according to the standards on page 4:	<b>Positive</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 61326-1: 2013](#) Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

Remark: This EUT is ranged to the Group 1 Class A apparatus according to the standard of CISPR 11: 2010 clause 5.2.



## 2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

■ - supplied by the manufacturer

■ - supplied by the lab

■ Current loop	Manufacturer :	/
	Model No. :	/
■ Lamp	Manufacturer :	/
	Model No. :	/

## 2.6. Compliance criteria

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

### Performance criterion A

The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

### Performance criterion B

The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

EXAMPLE 1 A data transfer is controlled/checked by parity check or by other means. In the case of malfunctioning, such as caused by a lightning strike, the data transfer will be repeated automatically. The reduced data transfer rate at this time is acceptable.

EXAMPLE 2 During testing, an analogue function value may deviate. After the test, the deviation vanishes.

EXAMPLE 3 In the case of a monitor used only for man-machine monitoring, it is acceptable that some degradation takes place for a short time, such as flashes during the burst application.

EXAMPLE 4 An intended change of the operating state is allowed if self-recoverable.

### Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

EXAMPLE 1 In the case of an interruption in the mains longer than the specified buffer time, the power supply unit of the equipment is switched off. The switch-on may be automatic or carried out by the operator.

EXAMPLE 2 After a programme interruption caused by a disturbance, the processor functions of the equipment stops at a defined position and is not left in a "crashed state". The operator's decision prompts may be necessary.

EXAMPLE 3 The test results in an opening of an over-current protection device that is replaced or reset by the operator.

### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Shenzhen Huatongwei International Inspection Co., Ltd.  
Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, Guangdong, China  
Tel: 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. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

##### **FCC-Registration No.: 762235**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No: 762235.

##### **IC-Registration No.: 5377B-1, 5377B-2**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B.

##### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

##### **VCCI**

Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20007.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. Has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-20001.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-20001.

The 3m Semi-anechoic chamber (9.1m×6.4m×6.0m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-4398.



### 3.3. Environmental conditions

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

Temperature: 22-25° C

Humidity: 40-54%

Atmospheric pressure: 950-1050 mbar

### 3.4. Test Description

Emission Measurement		
Radiated Emission	EN 61326-1: 2013 CISPR 11: 2010	PASS
Conducted Disturbance	EN 61326-1: 2013 CISPR 11: 2010	PASS
Immunity Measurement		
Electrostatic Discharge	EN 61326-1: 2013 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility	EN 61326-1: 2013 IEC 61000-4-3: 2006+A1: 2007+A2: 2010	PASS
Electrical Fast Transient/Burst Test	EN 61326-1: 2013 IEC 61000-4-4: 2012	PASS
Surge Test	EN 61326-1: 2013 IEC 61000-4-5: 2014	PASS
Conducted Susceptibility Test	EN 61326-1: 2013 IEC 61000-4-6: 2013	PASS
Power Frequency Magnetic Field Susceptibility Test	EN 61326-1: 2013 IEC 61000-4-8: 2009	PASS
Voltage Dips and Interruptions Test	EN 61326-1: 2013 IEC 61000-4-11: 2004	PASS

Note: "N/A" means "not applicable". The measurement uncertainty is not included in the test result.

### 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 IEC 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	30~1000MHz	4.24dB	(1)
Conducted Disturbance	0.15~30MHz	3.35dB	(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/ Radiated power (30MHz-1000MHz)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra-Broadband Antenna	SCHWARZB ECK	VULB9163	538	4/5/2017	4/4/2020
2	Emi Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
3	Pre-amplifier	SCHWARZB ECK	BBV 9743	9743-0022	10/18/2017	10/17/2018
4	Turntable	Maturo Germany	TT2.0-1T	/	N/A	N/A
5	Antenna Mast	Maturo Germany	CAM-4.0-P-12	/	N/A	N/A
6	Test Software	R&S	ES-K1	/	N/A	N/A

Conducted Disturbance						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	EMI Test Receiver	R&S	ESCS30	100038	11/11/2017	11/10/2018
2	Artificial Mains	R&S	ESH3-Z5	100049	11/11/2017	11/10/2018
3	Pulse Limiter	R&S	ESH3-Z2	100449	11/11/2017	11/10/2018
4	Current Probe	R&S	EZ-17	100014	11/11/2017	11/10/2018
5	Test Software	R&S	ES-K1	/	N/A	N/A

## Voltage Dips and Interruptions

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Purified Power Source	EM TEST	ACS 500N	V110610879 8	11/11/2017	11/10/2018
2	Test Software	EM TEST	DPA	/	N/A	N/A

## Electrostatic Discharge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	ESD Simulator	DITO	0301-04	P125110788 8	08/10/2017	08/09/2018

## Electrical Fast Transient/Burst

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	P130511113 5	11/11/2017	11/10/2018
2	3-Phase Coupling Network	EM TEST	CNI503 S5/16A	P132611977 5	11/11/2017	11/10/2018
3	Test Software	EM TEST	ISM IEC	/	N/A	N/A

## RF Field Strength Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	R&S	SMB100A	114360	6/13/2017	6/12/2018
2	Amplifier	R&S	BBA150- BC500	102664	6/30/2017	6/29/2018
3	Amplifier	R&S	BBA150 D200	102728	8/22/2017	8/21/2018
4	Amplifier	R&S	BBA150 E200	102729	8/23/2017	8/22/2018
5	Power Head	R&S	NRP18A	101010	6/12/2017	6/11/2018
6	Power Head	R&S	NRP18A	101011	6/12/2017	6/11/2018
7	Transmit Antenna	Schwarzbeck	STLP9129	00044	7/12/2017	7/11/2018
8	Field Probe	AR	FL7006/KIT	0348555	6/23/2017	6/22/2018
9	RF switch	R&S	OSP120	101859	6/14/2017	6/13/2018
10	Test Software	R&S	EMC32	100916	NA	NA

Surge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Surge Generator	EM TEST	VCS500N10T	P131811830 9	11/11/2017	11/10/2018
2	Coupling Network	EM TEST	CNV501S4.1	P141313287 4	11/11/2017	11/10/2018
3	4-Lines Coupling Network	EM TEST	CNV504N3	P132912049 4	11/11/2017	11/10/2018
4	Test Software	EM TEST	IEC	/	N/A	N/A

Conducted Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	IFR	2023A	202304/060	11/11/2017	11/10/2018
2	Amplifier	AR	75A250	302205	11/11/2017	11/10/2018
3	Dual Directional Coupler	AR	DC2600	302389	11/11/2017	11/10/2018
4	6db Attenuator	EMTEST	ATT6/75	0010230A	11/11/2017	11/10/2018
5	CDN	EMTEST	CDN M3/32A	5100103200 23	11/11/2017	11/10/2018
6	Em Clamp	LÜTHI	EM101	335625	11/11/2017	11/10/2018
7	Test Software	AR	SW1004	/	N/A	N/A

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Ultra Compact Simulator	EM TEST	UCS500M6	P125110727 8	11/11/2017	11/10/2018
2	Motor Driven Voltage Transformer	EM TEST	MV2616	P130310928 6	11/11/2017	11/10/2018
3	Current Transformer	EM TEST	MC2630	P130310925 3	11/11/2017	11/10/2018
4	Magnetic Coil	EM TEST	MS100	P130411082 6	11/11/2017	11/10/2018
5	Test Software	EM TEST	ISM IEC	/	N/A	N/A

## **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: May. 17, 2018

Operator: SHOWER.DAI

#### **4.1.2. Limits of disturbance (Class A)**

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 230	3	50
230 ~ 1000	3	57

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 is in the normal operation during the test, 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

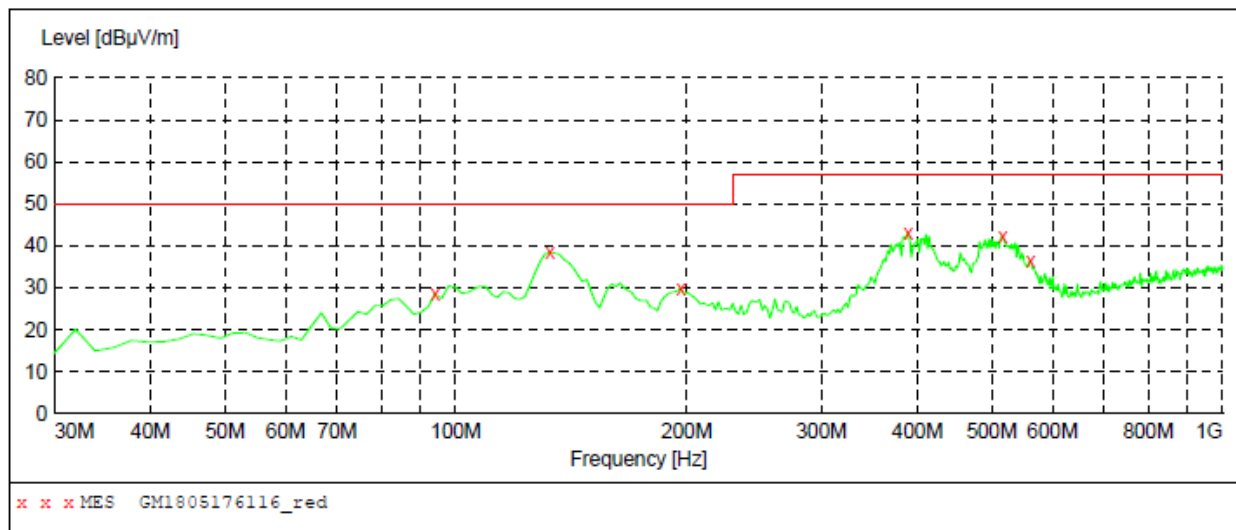
Frequency Range: 30MHz to 1000MHz

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

Margin=limit-level

Level=read value+transducer

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

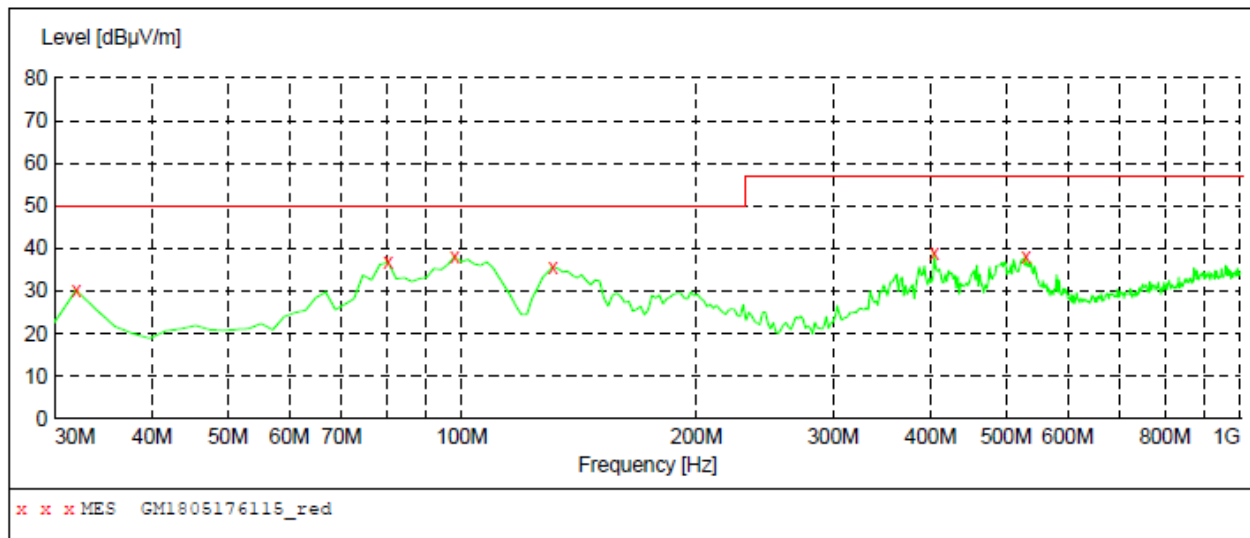


**MEASUREMENT RESULT: "GM1805176116\_red"**

5/17/2018

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
94.020000	28.50	-11.7	50.0	21.5	QP	300.0	155.00	HORIZONTAL
132.820000	38.40	-13.6	50.0	11.6	QP	300.0	360.00	HORIZONTAL
196.840000	30.00	-9.8	50.0	20.0	QP	100.0	228.00	HORIZONTAL
388.900000	43.10	-4.6	57.0	13.9	QP	100.0	13.00	HORIZONTAL
516.940000	42.40	-1.4	57.0	14.6	QP	100.0	356.00	HORIZONTAL
561.560000	36.30	-0.5	57.0	20.7	QP	100.0	360.00	HORIZONTAL





### MEASUREMENT RESULT: "GM1805176115\_red"

5/17/2018

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	30.20	-13.2	50.0	19.8	QP	100.0	3.00	VERTICAL
80.440000	36.80	-15.5	50.0	13.2	QP	100.0	119.00	VERTICAL
97.900000	38.10	-10.8	50.0	11.9	QP	100.0	92.00	VERTICAL
130.880000	35.70	-13.4	50.0	14.3	QP	100.0	170.00	VERTICAL
404.420000	39.10	-4.1	57.0	17.9	QP	100.0	210.00	VERTICAL
530.520000	38.20	-1.1	57.0	18.8	QP	100.0	107.00	VERTICAL

## 4.2. Conducted disturbance

For test instruments and accessories used see section 3.6.

### 4.2.1. Description of the test location

Test location: Shielded room No. 5

Date of test: May. 21, 2018

Operator: SHOWER.DAI

### 4.2.2. Limits of disturbance

Limit of conducted disturbance at the mains ports (Class A)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150 ~ 0.500	79	66
0.500 ~ 30.000	73	60

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

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

#### 4.2.3.1. Operating Condition

The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

#### 4.2.3.2. Test Configuration and Procedure

EUT is placed on a nonmetal table 0.8 meter above the grounded reference plane. The power line of the EUT is connected to the LISN which is connected to receiver by coaxial line, and then disturbance signals of the neutral line and live line can be detected by the receiver.

## 4.2.3.3. Photo of the test set-up



## 4.2.4. Test result

The requirements are **Fulfilled**

Band Width: 9kHz

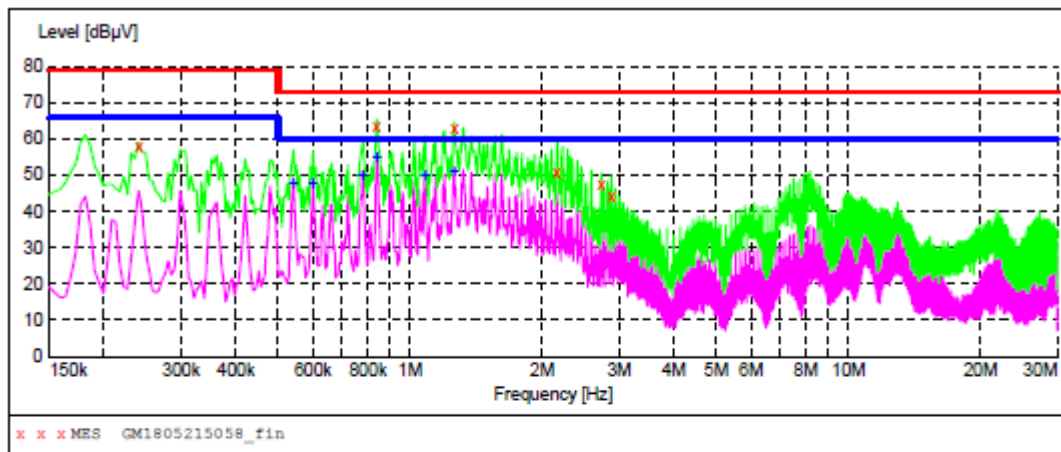
Frequency Range: 150kHz to 30MHz

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

Margin=limit-level

Level=read value+transducer

Transducer=insertion loss of LISN+cable loss+insertion loss of pulse limiter



# MEASUREMENT RESULT: "GM1805215058\_fin"

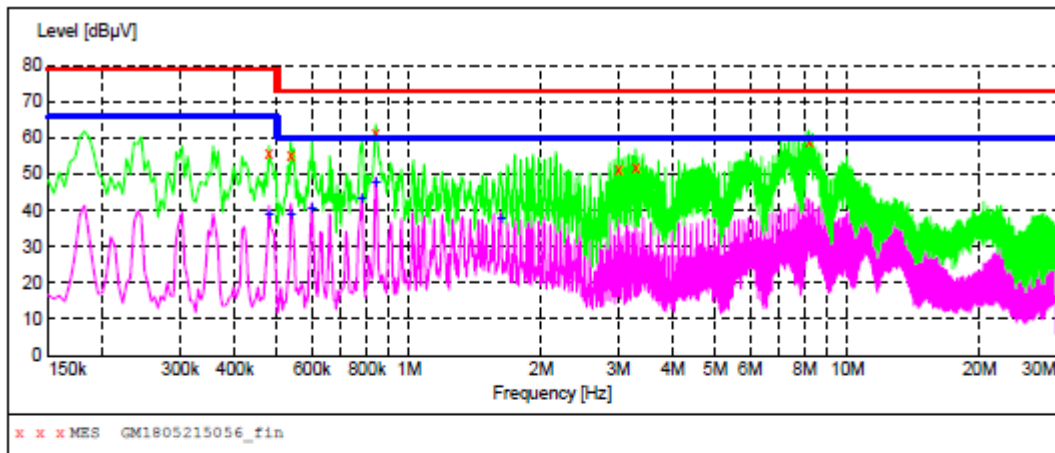
5/21/2018 6:56PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.240000	58.00	9.9	79	21.0	QP	L1	GND
0.838500	63.80	10.0	73	9.2	QP	L1	GND
1.261500	63.10	10.1	73	9.9	QP	L1	GND
2.161500	50.70	10.1	73	22.3	QP	L1	GND
2.733000	47.40	10.1	73	25.6	QP	L1	GND
2.881500	44.40	10.1	73	28.6	QP	L1	GND

# MEASUREMENT RESULT: "GM1805215058\_fin2"

5/21/2018 6:56PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.541500	48.20	10.0	60	11.8	AV	L1	GND
0.600000	47.80	10.0	60	12.2	AV	L1	GND
0.780000	50.40	10.0	60	9.6	AV	L1	GND
0.838500	55.50	10.0	60	4.5	AV	L1	GND
1.081500	50.10	10.1	60	9.9	AV	L1	GND
1.261500	51.20	10.1	60	8.8	AV	L1	GND



### MEASUREMENT RESULT: "GM1805215056\_fin"

5/21/2018 6:54PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.478500	55.70	9.9	79	21.3	QP	N	GND
0.537000	55.00	10.0	73	18.0	QP	N	GND
0.838500	61.20	10.0	73	11.8	QP	N	GND
3.003000	51.50	10.1	73	21.5	QP	N	GND
3.291000	51.80	10.1	73	21.2	QP	N	GND
8.191500	59.10	10.4	73	13.9	QP	N	GND

### MEASUREMENT RESULT: "GM1805215056\_fin2"

5/21/2018 6:54PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.478500	39.10	9.9	66	26.9	AV	N	GND
0.537000	39.00	10.0	60	21.0	AV	N	GND
0.600000	41.00	10.0	60	19.0	AV	N	GND
0.780000	43.60	10.0	60	16.4	AV	N	GND
0.838500	48.10	10.0	60	11.9	AV	N	GND
1.621500	38.30	10.1	60	21.7	AV	N	GND

### 4.3. Electrostatic discharge

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: May. 21, 2018

Operator: SI.DING

#### 4.3.2. Severity levels of electrostatic discharge

4.3.2.1. Severity level: Contact Discharge at  $\pm 2, 4\text{kV}$  Air Discharge at  $\pm 2, 4, 8\text{kV}$

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

4.3.2.2. Performance criterion: **B**

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

##### 4.3.3.1. Operating Condition

The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

##### 4.3.3.2. Test Configuration and Procedure:

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 10 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 performance criterion.

#### 4.3.3.3. Photo of the test set-up



#### 4.3.4. Test specification:

Contact discharge voltage:

■ 2 kV      ■ 4 kV      □ 6 kV

Number of discharges:

■ 10      □ 25

Air discharge voltage:

■ 2 kV      ■ 4 kV      ■ 8 kV

Number of discharges:

■ 10      □ 25

Type of discharge:

Direct discharge

■ Air discharge

■ Contact discharge

Indirect discharge

■ Contact discharge

Polarity:

■ Positive

■ Negative

Discharge location:

■ see photo documentation of the test set-up

■ all external locations accessible by hand

■ horizontal coupling plane (HCP)

■ vertical coupling plane (VCP)

#### 4.3.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

#### 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: May. 18, 2018

Operator: JIURU.PAN

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

4.4.2.1. Severity level: 3 V/m 1 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 is in the normal operation during the test, and the results of the maximum emanation are recorded.

4.4.3.2. Test Procedure

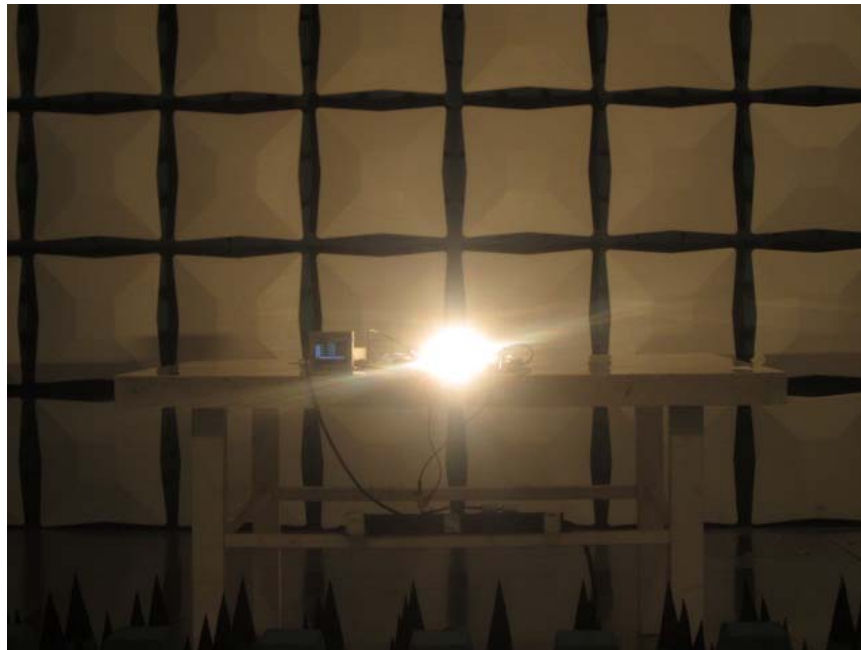
EUT and its auxiliary instrument are placed on a turntable which is 0.8 meter above ground. Transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of the four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and 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



## 4.4.4. Test specification:

<u>Frequency range:</u>	■ 80 MHz to 1000 MHz
<u>Field strength:</u>	■ 3 V/m
<u>Frequency range:</u>	■ 1400 MHz to 2000 MHz
<u>Field strength:</u>	■ 3 V/m
<u>Frequency range:</u>	■ 2000 MHz to 2700 MHz
<u>Field strength:</u>	■ 1 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1kHz
<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 no deviation was detected to the selected operation mode(s).

## 4.5. Electrical fast transients / Burst

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: May. 21, 2018

Operator: SI.DING

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

4.5.2.1. Severity level:  $\pm 1\text{kV}$  for AC power supply lines  
 $\pm 0.5\text{kV}$  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	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	5	2	5
X	Special	Special	Special	Special

4.5.2.2. Performance criterion: **B**

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

#### 4.5.3.1. Operating Condition

The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

#### 4.5.3.2. 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.

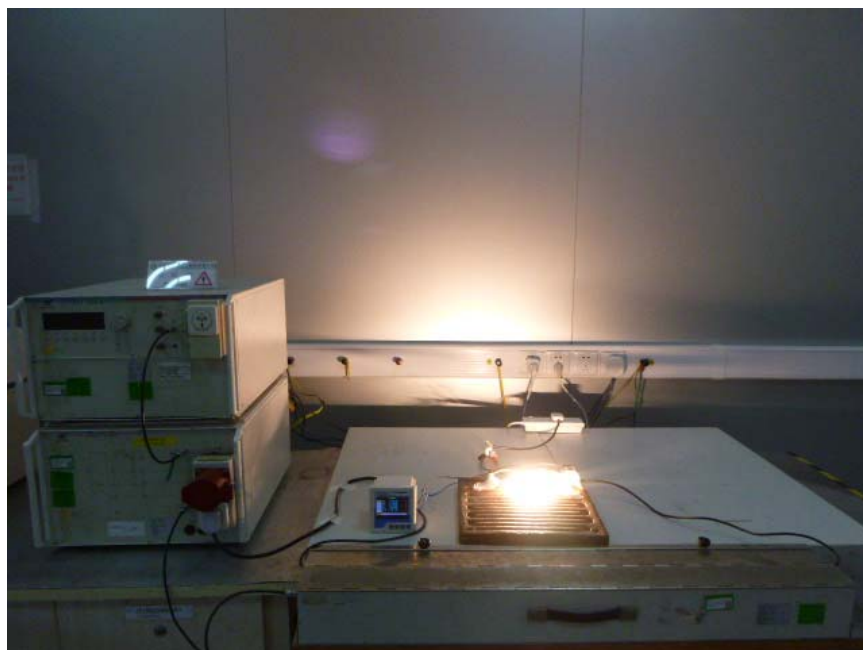
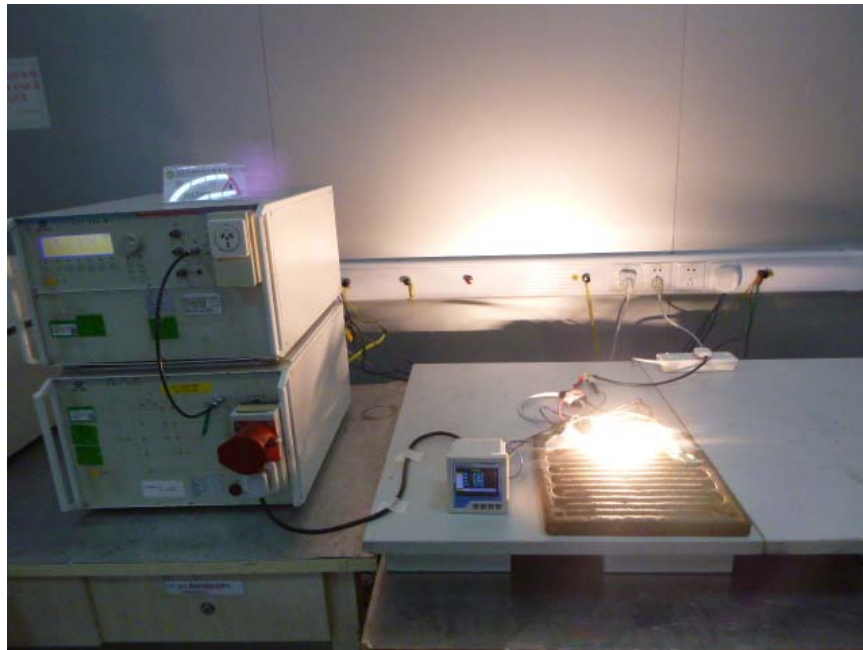
#### 4.5.3.3. Test Configuration and Procedure

For AC power input ports:

EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both positive and negative 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.

## 4.5.3.4. Photo of the test set-up



**4.5.4. Test specification:**

Coupling network:                    ☒ 0.5 kV        ☒ 1 kV        ☐ 2 kV  
Coupling clamp:                    ☒ 0.5 kV        ☐ 1 kV  
Burst frequency:                    ☒ 5.0 kHz  
Coupling duration:                    ☒ 60 s  
Polarity:                            ☒ positive                    ☒ negative

**4.5.5. Coupling points**

Cable description:                    AC power line; Signal

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Screening:                            ☐ screened                    ☒ unscreened  
Status:                                ☐ passive                    ☒ active  
Signal transmission:                    ☒ analogue                    ☐ digital  
Length:                                ☒ / m

**4.5.6. Test result**

The requirements are **Fulfilled**

Performance Criterion: **B**

## 4.6. Surge

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: May. 21, 2018

Operator: SI.DING

### 4.6.2. Severity levels of surge

4.6.2.1. Severity level: Line to line:  $\pm 1\text{kV}$ , Line to PE:  $\pm 2\text{kV}$

Level	Test Voltage (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

4.6.2.2. Performance Criterion: **B**

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

#### 4.6.3.1. Operating Condition

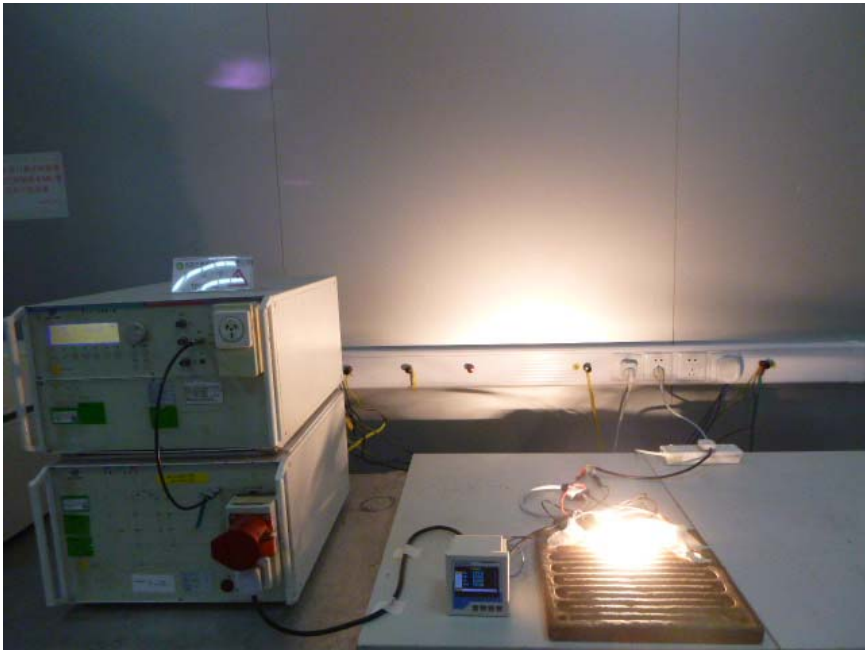
The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

#### 4.6.3.2. Test Configuration and Procedure

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 twice of 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 3 different phase angles ( $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ ) during the test.

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



4.6.4. Test specification:

<u>Pulse amplitude-Power line sym.:</u>	<input checked="" type="checkbox"/> 0.5 kV	<input checked="" type="checkbox"/> 1 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV
Source impedance: 2 $\Omega$ + 18 $\mu$ F				
<u>Pulse amplitude-Power line unsym.:</u>	<input type="checkbox"/> 0.5 kV	<input type="checkbox"/> 1 kV	<input type="checkbox"/> 2 kV	<input type="checkbox"/> 4 kV
Source impedance: 12 $\Omega$ + 9 $\mu$ F				
<u>Number of surges:</u>	<input checked="" type="checkbox"/> 5 Surges/Phase angle			
<u>Phase angle:</u>	<input checked="" type="checkbox"/> 0 °	<input checked="" type="checkbox"/> 90 °	<input checked="" type="checkbox"/> 180 °	<input checked="" type="checkbox"/> 270 °
<u>Repetition rate:</u>	<input checked="" type="checkbox"/> 60 s			
<u>Polarity:</u>	<input checked="" type="checkbox"/> positive		<input checked="" type="checkbox"/> negative	

4.6.5. Coupling points

Cable description:	AC power line	
Screening:	<input type="radio"/> screened	<input checked="" type="checkbox"/> unscreened
Status:	<input type="radio"/> passive	<input checked="" type="checkbox"/> active
Signal transmission:	<input checked="" type="checkbox"/> analogue	<input type="radio"/> digital
Length:	<input checked="" type="checkbox"/> / m	

4.6.6. Test result

The requirements are **Fulfilled**

Performance Criterion: **B**

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

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: May. 21, 2018

Operator: SI.DING

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

#### 4.7.2.1. Severity Level: 3 V

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

#### 4.7.2.2. Performance Criterion: **A**

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

#### 4.7.3.1. Operating Condition

The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

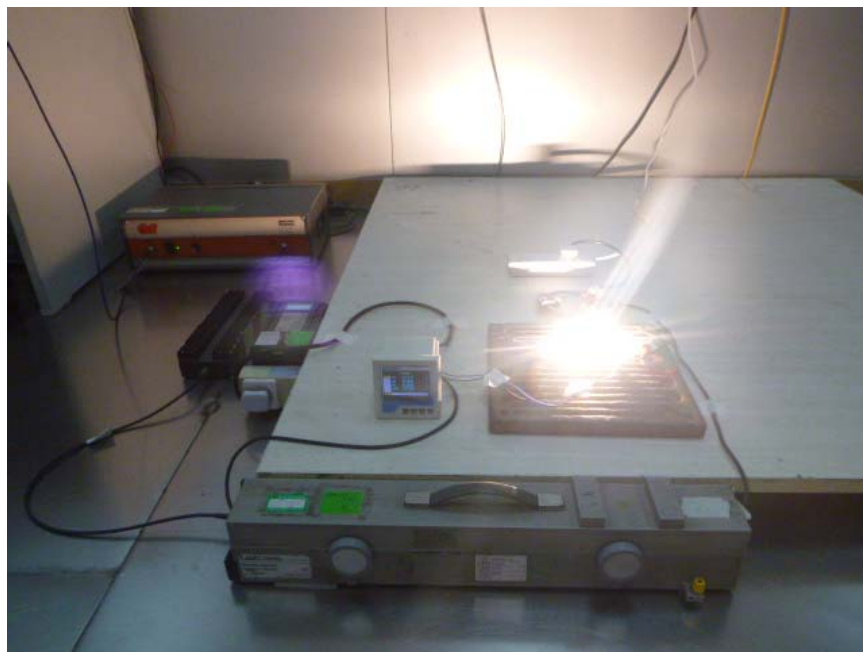
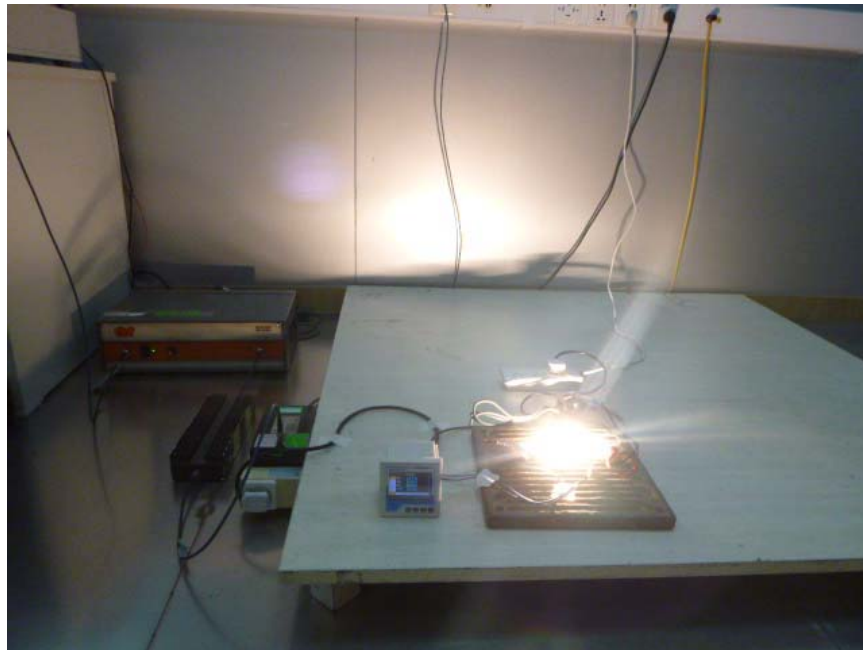
#### 4.7.3.2. Test Configuration and Procedure

For AC power input lines:

—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.

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

4.7.3.3. Photo of the test set-up





**4.7.4. Test specification:**

<u>Frequency range:</u>	■ 0.15 MHz to 80 MHz
<u>Test voltage:</u>	■ 3 V
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1kHz
<u>Frequency step:</u>	■ 1 % with 1 s dwell time

**4.7.5. Coupling points**

Cable description : AC power line; Signal

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

**4.7.6. Test result**

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 4.8. Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

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

Test location: Shielded room No. 8

Date of test: May. 21, 2018

Operator: SI.DING

### 4.8.2. Severity levels of magnetic field immunity

4.8.2.1. Severity Level: 3 A/m

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

4.8.2.2. Performance Criterion: **A**

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

4.8.3.1. Operating Condition

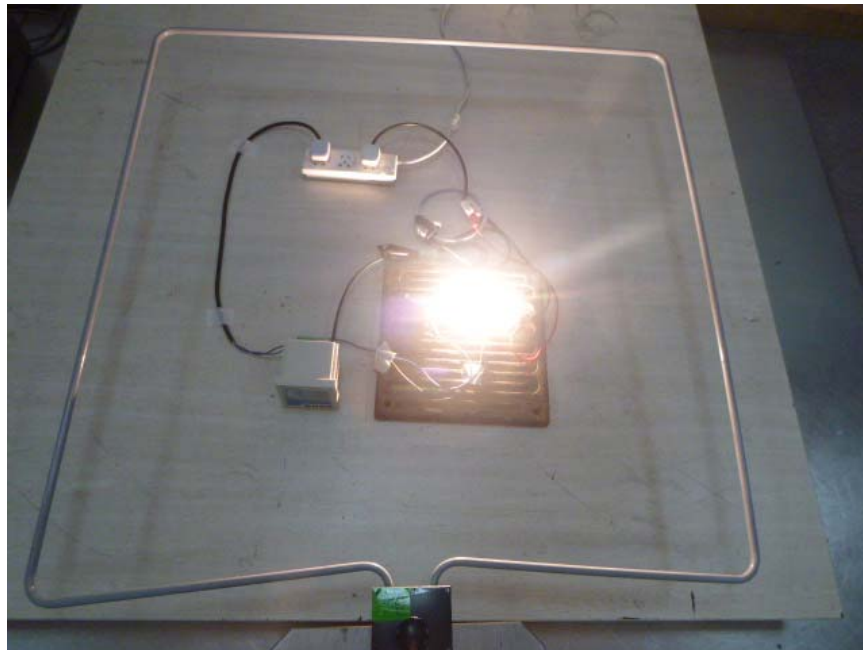
The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

4.8.3.2. Test Configuration and Procedure:

EUT is placed on an insulating 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 three orientations of the magnetic coil, X, Y and Z, shall be rotated in order to expose the EUT to the difference polarization magnetic field.

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

## 4.8.3.3. Photo of the test set-up



## 4.8.4. Test specification:

Test frequency: ☒ 50 Hz ☒ 60 Hz

Continuous field: ☒ 3 A/m

Test duration: ☒ 5 mins

Antenna factor: 0.917 A/m

Axis: ☒ x-axis ☒ y-axis ☒ z-axis

## 4.8.5. Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 4.9. Voltage Dips and Interruptions

For test instruments and accessories used see section 3.6.

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

Test location: Shielded room No. 5

Date of test: May. 21, 2018

Operator: TONY

### 4.9.2. Severity levels of voltage dips and interruptions

Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Duration (In Period)		Phase angle (°)
		50Hz	60Hz	
0	100	0.5/1	/	0 ° 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °
0/5	100/95	250	300	0 ° 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °
70	30	25	30	0 ° 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °
40	60	5	6	0 ° 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °

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

#### 4.9.3.1. Operating Condition

The EUT is in the normal operation during the test, and the results of the maximum emanation are recorded.

#### 4.9.3.2. Test Configuration and Procedure

EUT is connected to the simulator according to the test photo. When conducting this test the power supply shall be set at the minimum and maximum rated input voltages and test voltage changes shall be step changes and start at the phase angle of 0° and 180°.

## 4.9.3.3. Photo of the test set-up



## 4.9.4. Test specification:

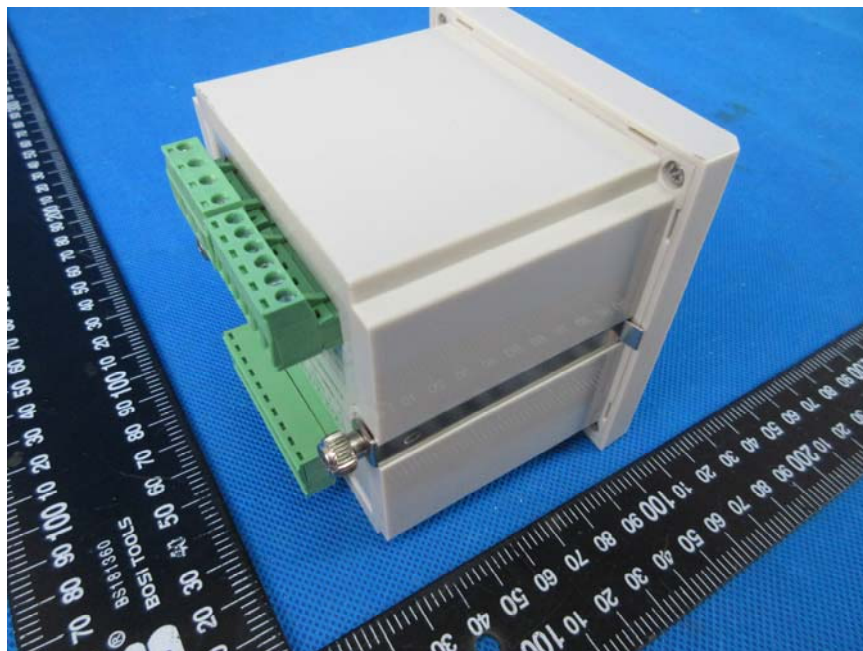
<u>Nominal Mains Voltage (<math>V_N</math>):</u>	■ 230 V AC    ■ 110 V AC
<u>Number of voltage fluctuations:</u>	■ 3
<u>Level of reduction(dip) / duration:</u>	■ 30 % / 500ms(50Hz&60Hz)
<u>Number of voltage fluctuations:</u>	■ 3
<u>Level of reduction(dip) / duration:</u>	■ 60 % / 100ms(50Hz&60Hz)
<u>Number of voltage fluctuations:</u>	■ 3
<u>Level of reduction(dip) / duration:</u>	■ 100 % / 10ms, 20ms (50Hz)
<u>Number of voltage fluctuations:</u>	■ 3
<u>Duration of the Interruption:</u>	■ 100 %, 95% / 5000ms(50Hz&60Hz)

## 4.9.5. Test result

The requirements are **Fulfilled**. Comply with IEC 61326-1: 2012 and IEC 61326-2-6: 2012.

## 5. External and Internal Photos of the EUT

### 5.1. External photos of the EUT

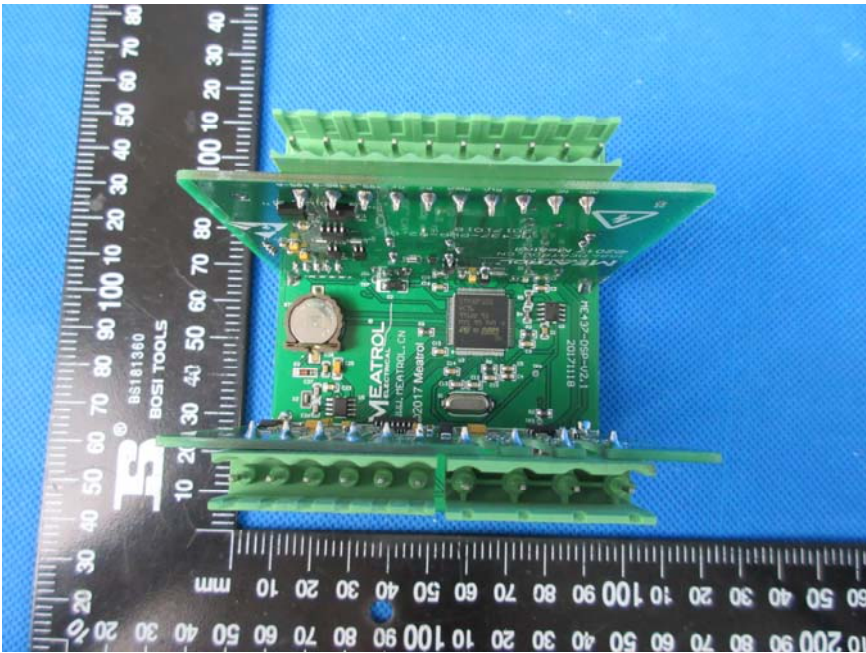
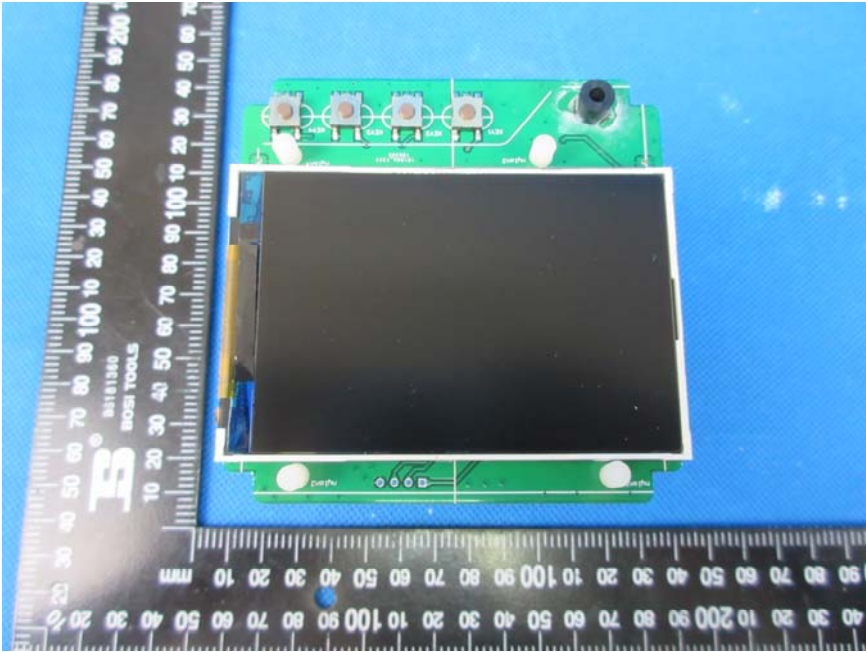




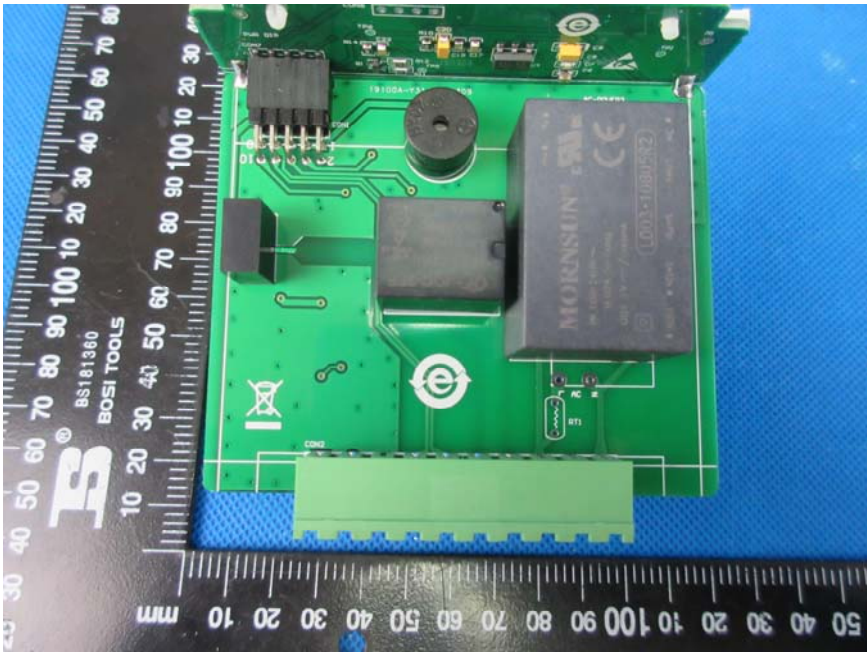
## 5.2. Internal photos of the EUT

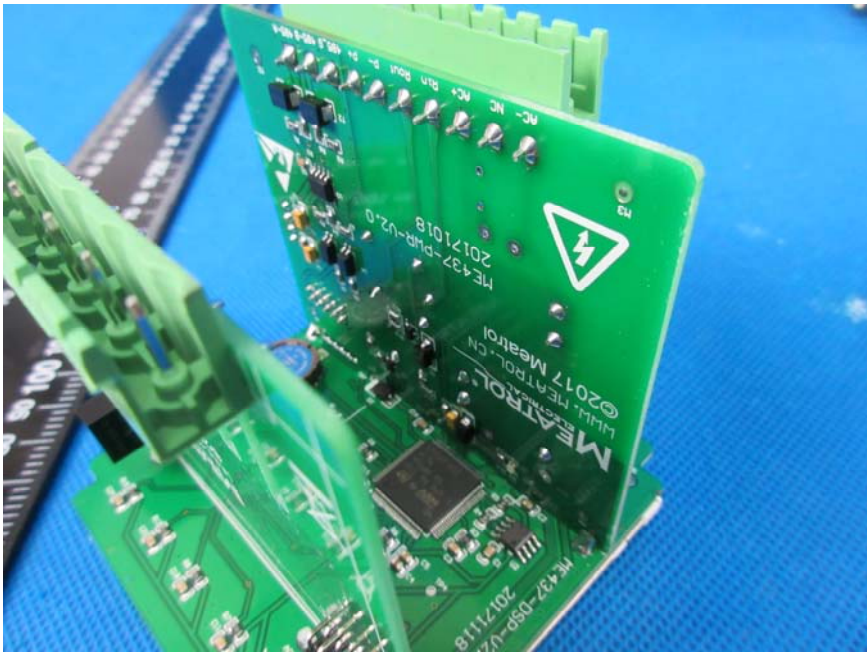
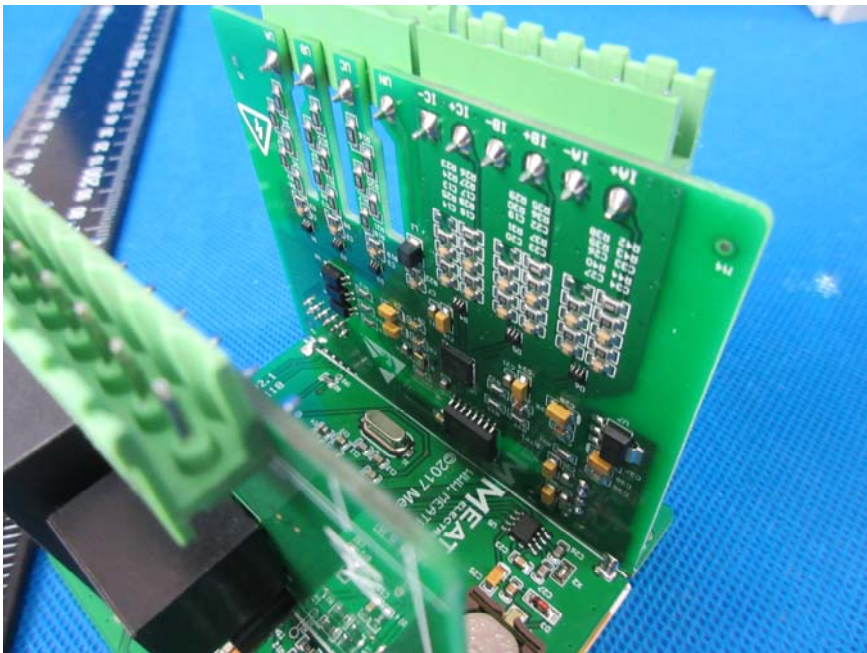












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