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SOUTH CHINA NATIONAL CENTER OF METROLOGY
GUANGDONG INSTITUTE OF METROLOGY

TEST REPORT

No. XNZ2020179

Name of Sample: Medical Intelligent Insulation Monitor/
Insulation fault locator/Signal Generator

Model / Type: AIM-M200/AIL150/ASG150; AIM-M100 ,AIM-M10

Sample Number: JYZ20050800005/JYZ20050800001/JYZ20050800010

Applicant: Acrel Co., Ltd.

Manufacturer: Acrel Co., Ltd.

Test Type: Commissioned Test

Date Issued: Jun. 15, 2020



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(1) Basic Information

Name of Sample	Medical Intelligent Insulation Monitor /Insulation fault locator /Signal Generator	Trade Mark	—
Model / Type	AIM-M200/AIL150/ASG150; AIM-M100 ,AIM-M10	Class	Relative uncertainty: ±10%, ±10kΩ
Sample No.	JYZ20050800005/JYZ20050800001 /JYZ20050800010	Sample quantity	1
Applicant	Acrel Co., Ltd.		
Applicant Address	No. 253, Yulv Road, Jiading District, Shanghai, China		
Manufacturer	Acrel Co., Ltd.		
Test Site	Environment and EMC Lab of Dongguan Branch		
Test Conditions	Temperature: (22~28) °C Humidity: (45~60) %RH		
Date Received	May 18, 2020	Commission No.	WT20201193
Test Date	May 18, 2020 to Jun. 04, 2020	Test Type	Commission
Test Item	1. Electrostatic discharge immunity tests; 2. Electromagnetic field tests; 3. Burst tests; 4. Surge immunity tests; 5. Conducted RF tests; 6. Power frequency magnetic field tests; 7. Emission - Mains terminal disturbance; 8. Emission - Electromagnetic radiation disturbance.		
Test Standard	1. IEC 61326-2-4 (Edition 2.0): 2012 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-4: Particular requirements – Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9 2. IEC 61000-4-8 (Edition2.0): 2009 Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques-Power frequency magnetic field immunity test 3. CISPR 11 (Edition 6.2): 2019 Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement		
Conclusion	PASS		
Remarks	—		



Tested by:

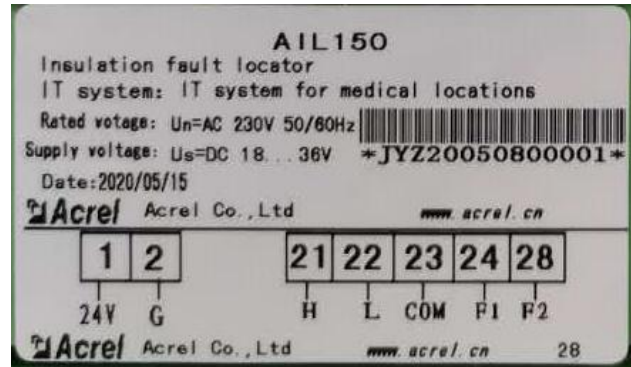
Checked by:

Approved by:

(2) Test Results Summary

No.	Test Item	Sample No.	Pass (P)	Fail (F)
1	Electrostatic discharge immunity tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
2	Electromagnetic field tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
3	Burst tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
4	Surge immunity tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
5	Conducted RF tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
6	Power frequency magnetic field tests	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
7	Emission - Mains terminal disturbance	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	
8	Emission - Electromagnetic radiation disturbance	JYZ20050800005 /JYZ20050800001 /JYZ20050800010	P	

(3) Sample Photo



(4) Main Metrology Instrument and Test Equipment

No.	Name of Instrument/Model	Serial No.	Certificate No. /Due Date	Technical Characteristic
1	ESD Generator /NSG437	231	WWM201900510 /2020-06-20	Voltage: $U_{rel}=1.3\%$, Current: $U_{rel}=3.0\%$ ($k=2$)
2	10m Semi-Anechoic Chamber /SAC-10M	P24213	WWD202000792 /2023-04-14	NSA deviation < 3.5dB VSWR \leq 5.5dB FU < 5.5dB
3	Signal Generator /SMB100A	103646	WWS201900537 /2020-06-25	Level: $\pm 0.5\text{dB}$, Frequency: $< (1.1 \times 10^{-6})$
4	Power Sensor /NRP-Z91	101017	WWS202000267 /2021-04-06	$U_{rel}=2\%$, $k=2$
5	Electric Field Probe and Readout Equipment /CTR1002A	08000195&09100580SN0-08	WWD201903095 /2020-11-06	$\pm 1.5\text{dB}$
6	Fast Transient Burst Generator /NSG 2025	26560	WWM202000144 /2021-03-24	Peak Voltage: $\pm 10\%$, Rise Time: $\pm 30\%$, Pulse Width: (35~150) ns
7	Surge Generator /NSG 2050	200124-049AR	WWM202000145 /2021-03-24	Peak Voltage: $U_{rel}=2.0\%$, Front Time: $U_{rel}=4.0\%$, Duration Time: $U_{rel}=3.0\%$, Peak Current: $U_{rel}=3.0\%$ ($k=2$)
8	Integrated Test System /IMS	1502.0009.12	WWS202000031 /2021-01-15	$U=1.0\text{dB}$ ($k=2$)
9	Test Receiver /ESCI	101046	WWS202000196 /2021-03-24	Level: $U=0.20\text{dB}$, Amplitude: $U=0.3\text{dB}$, Impulse response: $U=1.5\text{dB}$ ($k=2$)
10	Artificial Power Network / ESH2-Z5	100274	WWC201901865 /2020-10-30	Voltage distribution coefficient: $U=0.5\text{dB}$, $k=2$; Network impedance: $U_{rel}=9\%$ (10MHz) ($k=2$)
11	EMI Test Receiver /ESU	100258	WWS202000197 /2021-03-24	Level: $U=0.20\text{dB}$, Amplitude: $U=0.3\text{dB}$, Impulse response: $U=1.5\text{dB}$ ($k=2$)
12	Broadband Antenna /VLUB-9160	3230	WWD201902833 /2020-10-13	$U=1.2\text{dB}$ ($k=2$)
13	Power frequency magnetic field generator /CCN 1000-1 /NSG 1007-5-400-413	72685,58906	WWM202000146 /2021-03-24	$U=0.5\text{dB}$ ($k=2$)

(5) Test Result

5.1 Electrostatic discharge immunity tests

- 1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria A2;
- 2. Test method:
 - Supply voltage: DC 24V, test as the table-top equipment, powered-up test;
 - Response value: $R_{an}=50k\Omega$;
 - Quiescent mode: $R_F=1.3\times R_{an}$; Operate mode: $R_F=0.7\times R_{an}$;
 - Test voltage: Contact discharge $\pm 4kV$;
 - Air discharge $\pm 8kV$;
 - Number of discharge: 10 per polarity;
- 3. Test equipment: NSG 437
- 4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During and after the test, the alarm functions, measurement functions and man machine interface functions of EUTs continue to operate as intended.

6. Conclusion: Pass

5.2 Electromagnetic field tests

- 1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria A1;

2. Test method:

Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

Response value: $R_{an}=50k\Omega$;

Quiescent mode: $R_F=1.3\times R_{an}$; Operate mode: $R_F=0.7\times R_{an}$;

Frequency range: 80 MHz ~ 1000 MHz;

Field strength: 10 V/m;

Frequency range: 1.4GHz ~ 2.0GHz;

Field strength: 3 V/m;

Frequency range: 2.0GHz ~ 2.7GHz;

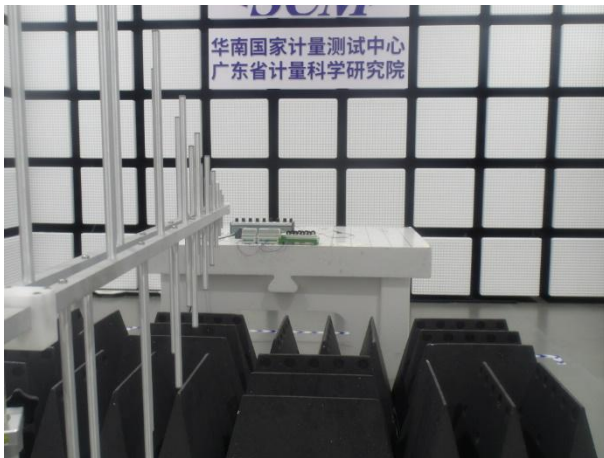
Field strength: 1 V/m;

Dwell time: 1s, step: 1%;

Modulate: 80 % AM, 1 kHz;

3. Test equipment: SAC-10M, SMB100A, NRP-Z91, CTR1002A

4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During the test, the insulation resistance changes from 66kΩ to 57kΩ in Quiescent mode, which is not greater than the relative uncertainty. After the test, the EUTs continues to operate as intended.

6. Conclusion: Pass

5.3 Burst tests

1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria A2;
2. Test method:
 - Supply voltage: DC 24V, test as the table-top equipment, powered-up test;
 - Response value: $R_{an}=50k\Omega$;
 - Quiescent mode: $R_F=1.3\times R_{an}$; Operate mode: $R_F=0.7\times R_{an}$;
 - T_r / T_h : 5/50ns;
 - Repetition frequency: 5 kHz;
 - Level: DC power supply $\pm 2kV$;
 - I/O control port $\pm 1kV$;
 - Test time: 60s per polarity.
3. Test equipment: NSG 2025
4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During and after the test, the alarm functions, measurement functions and man machine interface functions of EUTs continue to operate as intended.

6. Conclusion: Pass

5.4 Surge immunity tests

1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria B;
2. Test method:
 - Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

Response value: $R_{an}=50k\Omega$;

Quiescent mode: $R_F=1.3\times R_{an}$; Operate mode: $R_F=0.7\times R_{an}$;

T_r / T_h : 1.2/50 μ s;

Test port: I/O control port;

Level: Common mode/ $\pm 1kV$ 42 Ω , 0.5 μ F;

Number of tests: 5 positive and 5 negative;

Repetition rate: maximum 1/min;

3. Test equipment: NSG 2050

4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During and after the test, the alarm functions, measurement functions and man machine interface functions of EUTs continue to operate as intended.

6. Conclusion: Pass

5.5 Conducted RF tests

1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria A1;

2. Test method:

Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

Response value: $R_{an}=50k\Omega$;

Quiescent mode: $R_F=1.3 \times R_{an}$; Operate mode: $R_F=0.7 \times R_{an}$;

Test port: DC power supply;

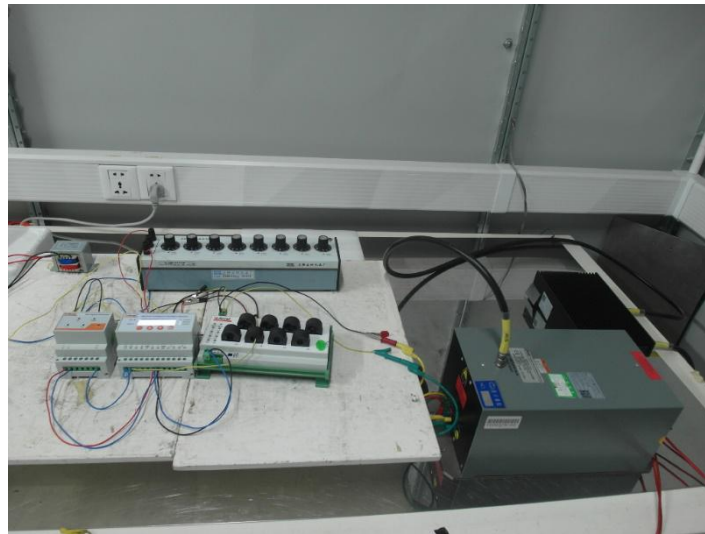
Frequency range: 150 kHz ~ 80 MHz;

Voltage level: 10 V;

Modulate: 80 % AM, 1 kHz;

3. Test equipment: IMS, NRP-Z91

4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During and after the test, the alarm functions, measurement functions and man machine interface functions of EUTs continue to operate as intended.

6. Conclusion: Pass

5.6 Power frequency magnetic field tests

1. Technical requirement: IEC 61326-2-4: 2012 Performance criteria A1;

2. Test method:

Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

Response value: $R_{an}=50k\Omega$;

Quiescent mode: $R_F=1.3 \times R_{an}$; Operate mode: $R_F=0.7 \times R_{an}$;

Magnetic field strength: 30A/m.

3. Test equipment: CCN 1000-1 NSG 1007-5-400-413

4. Test picture



5. Test result:

Sample Code	Test result
JYZ20050800005 /JYZ20050800001 /JYZ20050800010	During and after the test, the alarm functions, measurement functions and man machine interface functions of EUTs continue to operate as intended.

6. Conclusion: Pass

5.7 Emission – Mains terminal disturbance

1. Technical requirement:

Frequency	Limits
150 kHz ~ 500 kHz	79 dB μ V quasi-peak, 66 dB μ V average
500 kHz ~ 30 MHz	73 dB μ V quasi-peak, 60 dB μ V average

2. Test method:

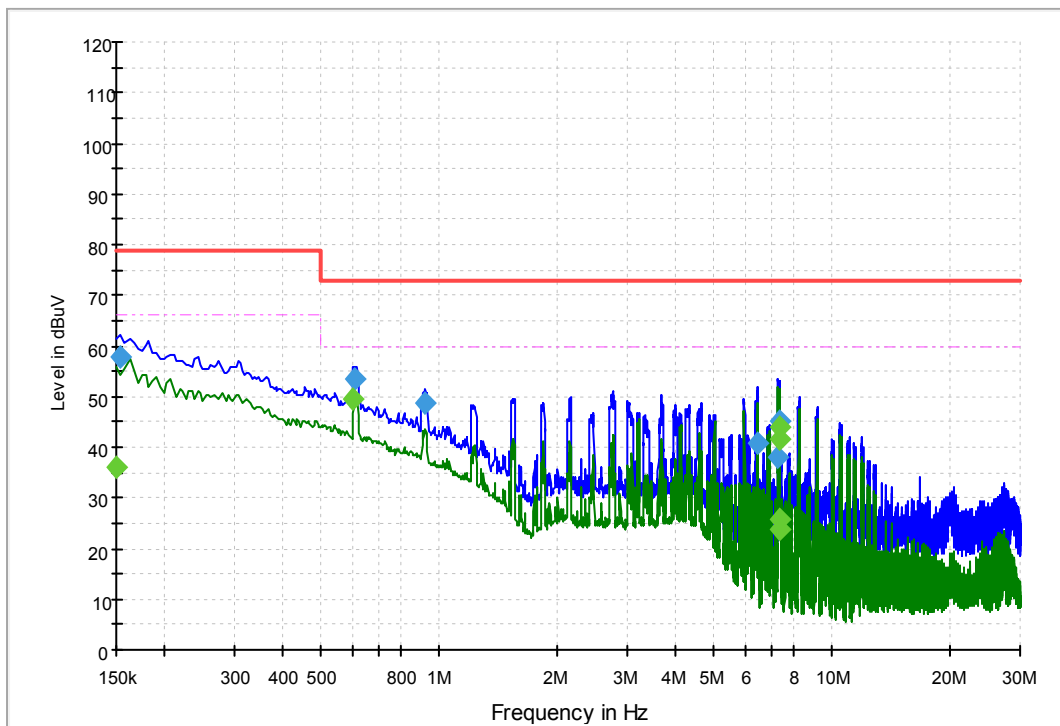
Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

3. Test equipment: ESCI, ESH2-Z5

4. Test picture



5. Test result:



Frequency(MHz)	QuasiPeak(dBμV)	Margin(dB)	Limit(dBμV)
0.154000	57.8	21.2	79.0
0.605000	53.5	19.5	73.0
0.917000	48.7	24.3	73.0
6.417000	40.9	32.1	73.0
7.277000	37.9	35.1	73.0
7.325000	45.1	27.9	73.0

Frequency(MHz)	Average(dBμV)	Margin(dB)	Limit(dBμV)
0.150000	36.2	29.8	66.0

0.601000	49.5	10.5	60.0
7.289000	25.9	34.1	60.0
7.297000	24.0	36.0	60.0
7.333000	41.8	18.2	60.0
7.341000	43.9	16.1	60.0

6. Conclusion: Pass

5.8 Emission –Electromagnetic radiation disturbance

1. Technical requirement:

Frequency	Limits
30 MHz ~ 230 MHz	40 dB μ V/m quasi-peak
230 MHz ~ 1 GHz	47 dB μ V/m quasi-peak

2. Test method:

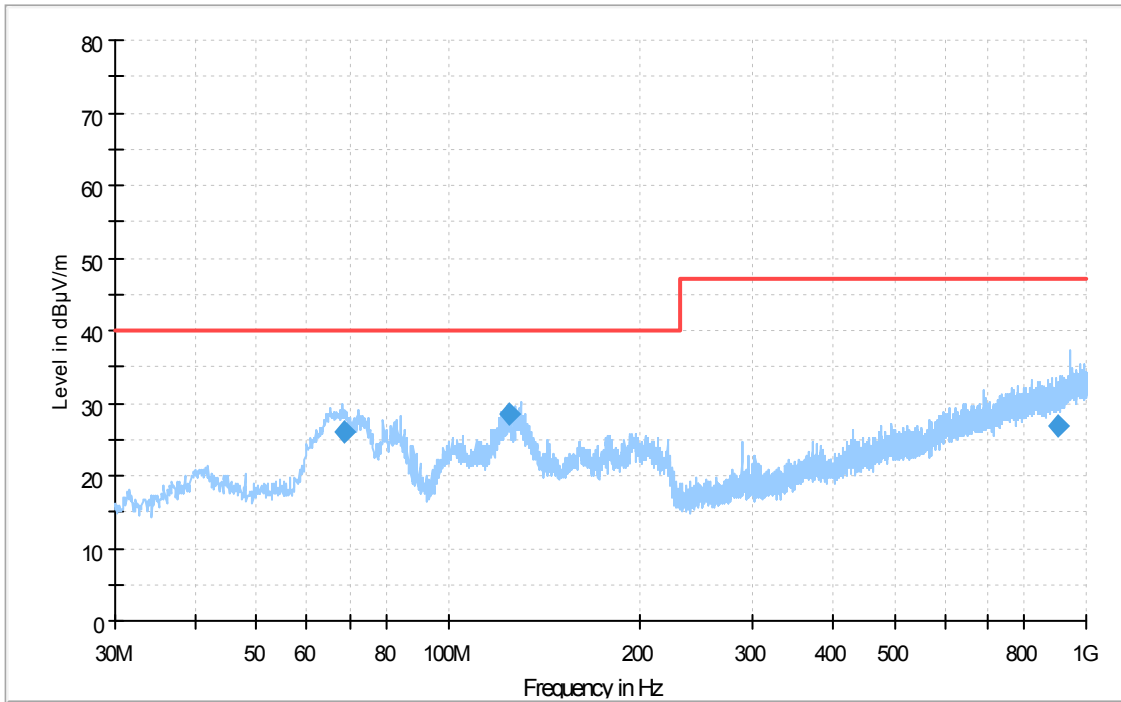
Supply voltage: DC 24V, test as the table-top equipment, powered-up test;

3. Test equipment: SAC-10M, ESU, VLUB-9160

4. Test picture:

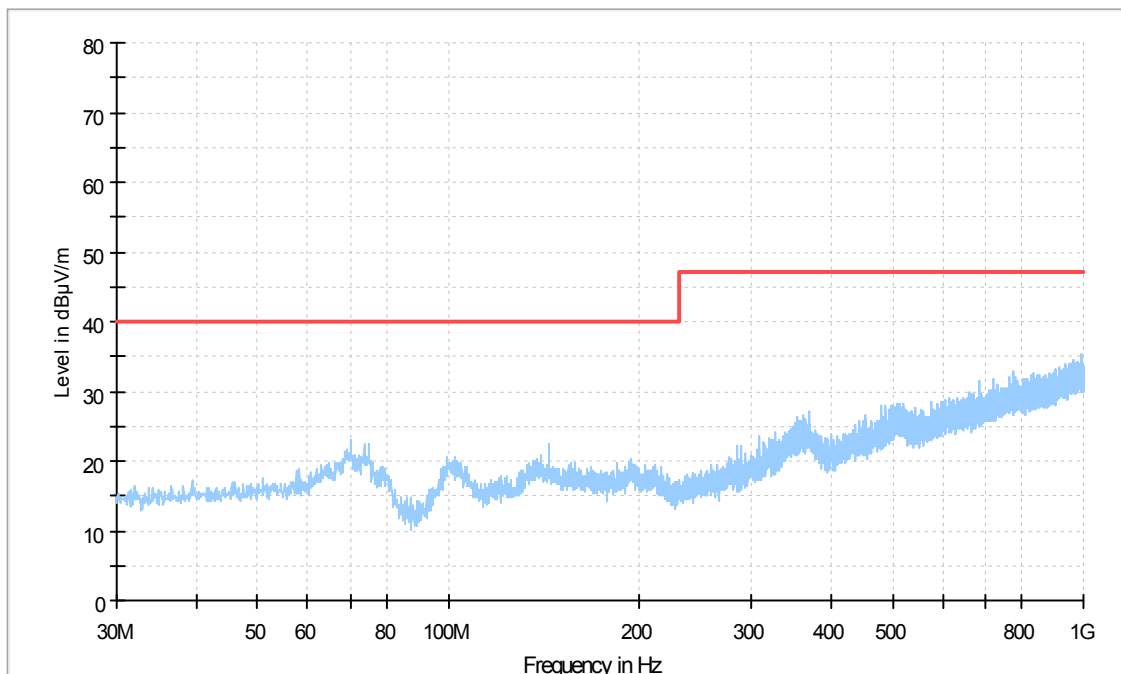


5. Test result:



Vertical direction (30MHz~1GHz)

Frequency(MHz)	QuasiPeak(dBµV/m)	Polarization	Margin(dB)	Limit(dBµV/m)
68.702200	26.2	V	13.8	40.0
124.706800	28.5	V	11.5	40.0
900.990120	26.9	V	20.1	47.0



Horizontal direction (30MHz~1GHz)

6. Conclusion: Pass