

EMC TEST REPORT
for
UNI-TREND TECHNOLOGY (CHINA) LIMITED

Ride meter
Model No.: UT312

Prepared for : UNI-TREND TECHNOLOGY (CHINA) LIMITED
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High-Tech Industrial Development Zone, Dongguan
City, Guangdong Province, China

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Report No. : ATE20152239
Date of Test : October 19, 2015
Date of Report : October 20, 2015

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Test Report

Applicant : UNI-TREND TECHNOLOGY (CHINA) LIMITED
Manufacturer : UNI-TREND TECHNOLOGY (CHINA) LIMITED
Product : Ride meter
Model No. : UT312

Measurement Procedure Used:

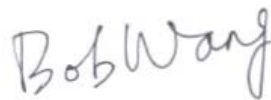
EN 61326-1: 2013 [Electrical equipment for measurement, control and laboratory use-EMC requirements-Part 1: General requirements]

EN 61326-2-2: 2013 [Electrical equipment for measurement, control and laboratory use-EMC requirements-Part 2-2: Particular requirements-Test configurations operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems]

The device described above is tested by Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Accurate Technology Co., Ltd. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 61326-1 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Accurate Technology Co., Ltd.

Date of Test : October 19, 2015
Date of Report : October 20, 2015

Prepared by : 
(Engineer)

Approved & Authorized Signer : 
(Manager)

1. TEST RESULTS SUMMARY

Test Items	Test Standard	Test Results
Radiated Emission	EN 61326-1: 2013 EN 61326-2-2: 2013 (EN 55011: 2009 + A1: 2010)	Pass
Electrostatic Discharge Immunity	EN 61326-1: 2013 EN 61326-2-2: 2013 (IEC 61000-4-2: 2008)	Pass
Radiated Electromagnetic Fields Immunity	EN 61326-1: 2013 EN 61326-2-2: 2013 (IEC 61000-4-3: 2010)	Pass

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product	: Ride meter
Model No.	: UT312
Trade Mark	: UNI-T
Remark(s)	: The EUT highest operating frequency provided by Manufacturer is less than 108 MHz, the radiated emission measurement shall be made up to 1 GHz.
Rating	: DC 9V
Applicant Address	: UNI-TREND TECHNOLOGY (CHINA) LIMITED : NO.6, Gong Ye Bei 1ST Road, Songshan Lake National High-Tech Industrial Development Zone, Dongguan City, Guangdong Province, China
Manufacturer Address	: UNI-TREND TECHNOLOGY (CHINA) LIMITED : NO.6, Gong Ye Bei 1ST Road, Songshan Lake National High-Tech Industrial Development Zone, Dongguan City, Guangdong Province, China
Date of sample receiver	: October 18, 2015
Date of Test	: October 19, 2015

2.2. Accessory and Auxiliary Equipment

n.a.

2.3. Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen
		Listed by FCC
		The Registration Number is 253065
		Listed by FCC
		The Registration Number is 752051
		Listed by Industry Canada
		The Registration Number is 5077A-1
		Listed by Industry Canada
		The Registration Number is 5077A-2
		Accredited by China National Accreditation Committee for Laboratories
		The Certificate Registration Number is L3193
Name of Firm	:	Accurate Technology Co., Ltd.
Site Location	:	F1, Bldg. A&D, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan District, Shenzhen 518057, P.R. China
Subcontracted Items	:	Radiated RF Electromagnetic Fields
Subcontractor	:	Shenzhen Academy of Metrology and Quality Inspection
Site Location	:	Electronic Products Safety Technical Center SOLID Industrial (Shenzhen) Co., Ltd.

2.4. Measurement Uncertainty

Radiated emission expanded uncertainty (9kHz-30MHz)	:	U=3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	U=4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	:	U=4.06dB, k=2
Conduction Emission Expanded Uncertainty	:	U=2.23dB, k=2
Power disturbance Expanded Uncertainty	:	U=2.92dB, k=2

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan.10, 2015	1 Year
2.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan.10, 2015	1 Year
3.	Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan.10, 2015	1 Year
4.	Test Receiver	Rohde& Schwarz	ESPI	100396/003	Jan.10, 2015	1 Year
5.	Test Receiver	Rohde& Schwarz	ESPI	101526/003	Jan.10, 2015	1 Year
6.	Test Receiver	Rohde& Schwarz	ESR	101817	Jan.10, 2015	1 Year
7.	Bilog Antenna	Schwarzbeck	VULB9163	9163-194	Jan.15, 2015	1 Year
8.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan.15, 2015	1 Year
9.	Log.-Per.Antenna	Schwarzbeck	VUSLP 9111B	9111B-074	Jan.15, 2015	1 Year
10.	Biconical Broad Band Antenna	Schwarzbeck	VHBB 9124+BBA 9106	9124-617	Jan.15, 2015	1 Year
11.	Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan.15, 2015	1 Year
12.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan.15, 2015	1 Year
13.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan.15, 2015	1 Year
14.	Vertical Active Monopole Antenna	Schwarzbeck	VAMP 9243	9243-370	Jan.15, 2015	1 Year
15.	RF Switching Unit+PreAMP	Compliance Direction	RSU-M2	38322	Jan.10, 2015	1 Year
16.	Pre-Amplifier	Agilent	8447D	294A10619	Jan.10, 2015	1 Year
17.	Pre-Amplifier	Rohde&Schwarz	CBLU11835 40-01	3791	Jan.10, 2015	1 Year
18.	50 Coaxial Switch	Anritsu Corp	MP59B	6200237248	Jan.10, 2015	1 Year
19.	50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.10, 2015	1 Year
20.	RF Coaxial Cable	Schwarzbeck	N-5m	No.1	Jan.10, 2015	1 Year
21.	RF Coaxial Cable	Schwarzbeck	N-1m	No.6	Jan.10, 2015	1 Year
22.	RF Coaxial Cable	Schwarzbeck	N-1m	No.7	Jan.10, 2015	1 Year
23.	RF Coaxial Cable	SUHNER	N-3m	No.8	Jan.10, 2015	1 Year
24.	RF Coaxial Cable	RESENBERGER	N-3.5m	No.9	Jan.10, 2015	1 Year
25.	RF Coaxial Cable	SUHNER	N-6m	No.10	Jan.10, 2015	1 Year
26.	RF Coaxial Cable	RESENBERGER	N-12m	No.11	Jan.10, 2015	1 Year
27.	RF Coaxial Cable	RESENBERGER	N-0.5m	No.12	Jan.10, 2015	1 Year
28.	RF Coaxial Cable	SUHNER	N-2m	No.13	Jan.10, 2015	1 Year
29.	RF Coaxial Cable	SUHNER	N-0.5m	No.15	Jan.10, 2015	1 Year
30.	RF Coaxial Cable	SUHNER	N-2m	No.16	Jan.10, 2015	1 Year
31.	RF Coaxial Cable	RESENBERGER	N-6m	No.17	Jan.10, 2015	1 Year

3.2.For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	PESD1610	H4001552	Jan.11, 2015	1 Year
2.	ESD Generator	TESEQ	NSG 437	823	Jan.11, 2015	1 Year

3.3.For RF Strength Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Eqpt No.	Last Cal.	Cal. Interval
1.	Signal Generator	Rohde & Schwarz	SMB100A	SB9422/02	Jul.03, 2014	1 Year
2.	Signal Generator	Rohde & Schwarz	SMF100A	SB8501/03	Apr.16, 2015	1 Year
3.	Voltage Meter	Rohde & Schwarz	URV5-Z2	SB9422/03	Apr.16, 2015	1 Year
4.	Voltage Meter	Rohde & Schwarz	URV5-Z2	SB9422/04	Apr.16, 2015	1 Year
5.	Power Probe	Rohde & Schwarz	NRP-Z81	SB9422/06	Apr.17, 2015	1 Year
6.	Power Probe	Rohde & Schwarz	NRP-Z81	SB9422/07	Apr.17, 2015	1 Year
7.	Power Meter	Rohde & Schwarz	NRP	SB9422/05	Apr.16, 2015	1 Year
8.	Power Amplifier	PRANA	MT310A	SB9422/08	Mar.23, 2015	1 Year
9.	Broadband Antenna	Rohde & Schwarz	HL046E	SB9422/13	Mar.28, 2015	1 Year
10.	Horn Antenna	AR	ATH800M5G A	SB9422/15	Mar.28, 2015	1 Year
11.	Power Amplifier	MILMEGA	A-001	SB9422/10	Mar.28, 2015	1 Year
12.	Power Meter	Rohde & Schwarz	NRVD	SB3437	Apr.16, 2015	1 Year

4. RADIATED EMISSION MEASUREMENT

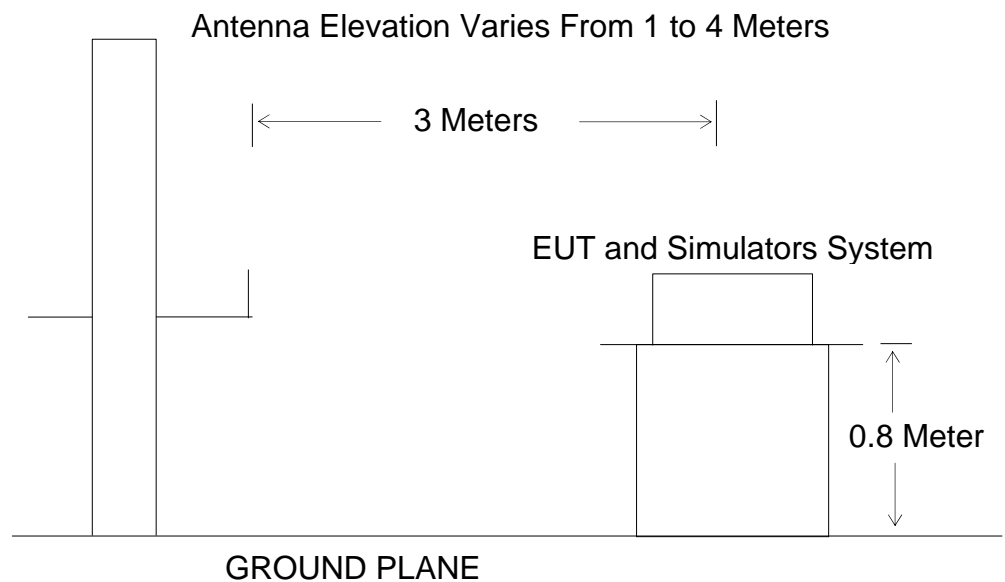
4.1. Block Diagram of Test

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Ride meter)

4.1.2. Block diagram of test setup (In chamber)



(EUT: Ride meter)

4.2. Measuring Standard

EN 61326-1: 2013, EN 61326-2-2: 2013 (EN 55011: 2009 + A1: 2010)

4.3. Radiated Emission Limits (Group 1, Class B)

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Frequency (MHz)	Distance (Meters)	Field Strengths Limit dB(μ V/m)
30—230	3	40
230—1000	3	47

- Note:
- (1) The smaller limit shall apply at the combination point between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

4.4. EUT Configuration on Test

Test equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

4.4.1. Ride meter (EUT)

Model No.: UT312

Manufacturer: UNI-TREND TECHNOLOGY (CHINA) LIMITED

4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown on Section 4.1.

4.5.2. Turn on the power of all equipments.

4.5.3. Let the EUT work in measuring mode (On) measure it.

4.6. Test Procedure

The EUT is placed on a turntable, which is 0.1 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) is used as a receiving antenna. Both horizontal and vertical polarizations of the antenna are set on test.

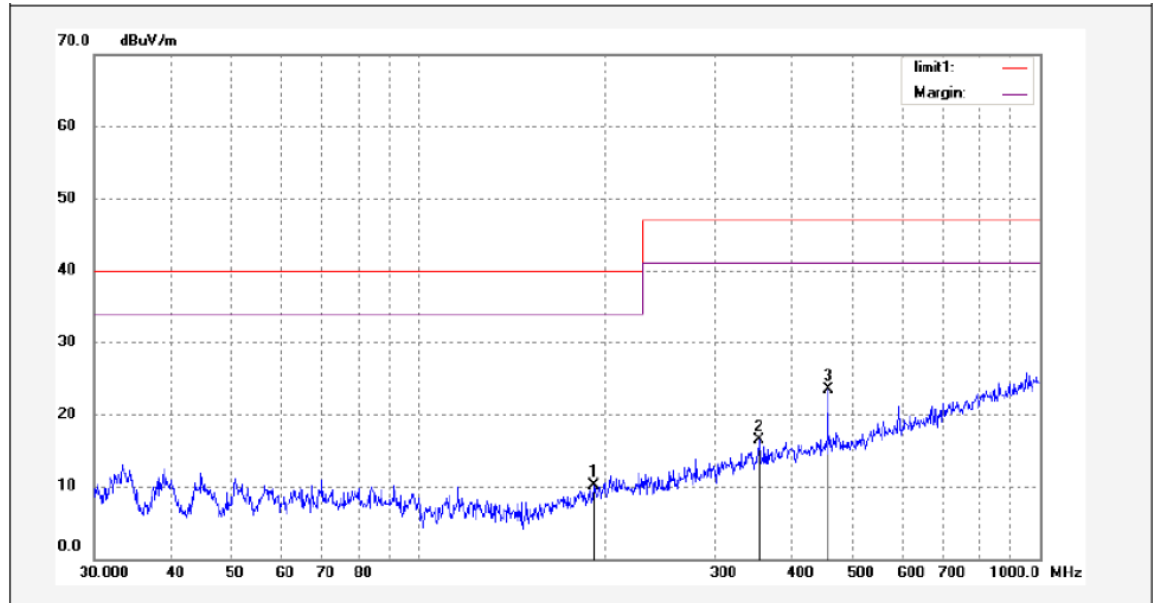
The bandwidth of the Receiver (ESCS30) is set at 120kHz.

4.7.Measuring Results

PASS.

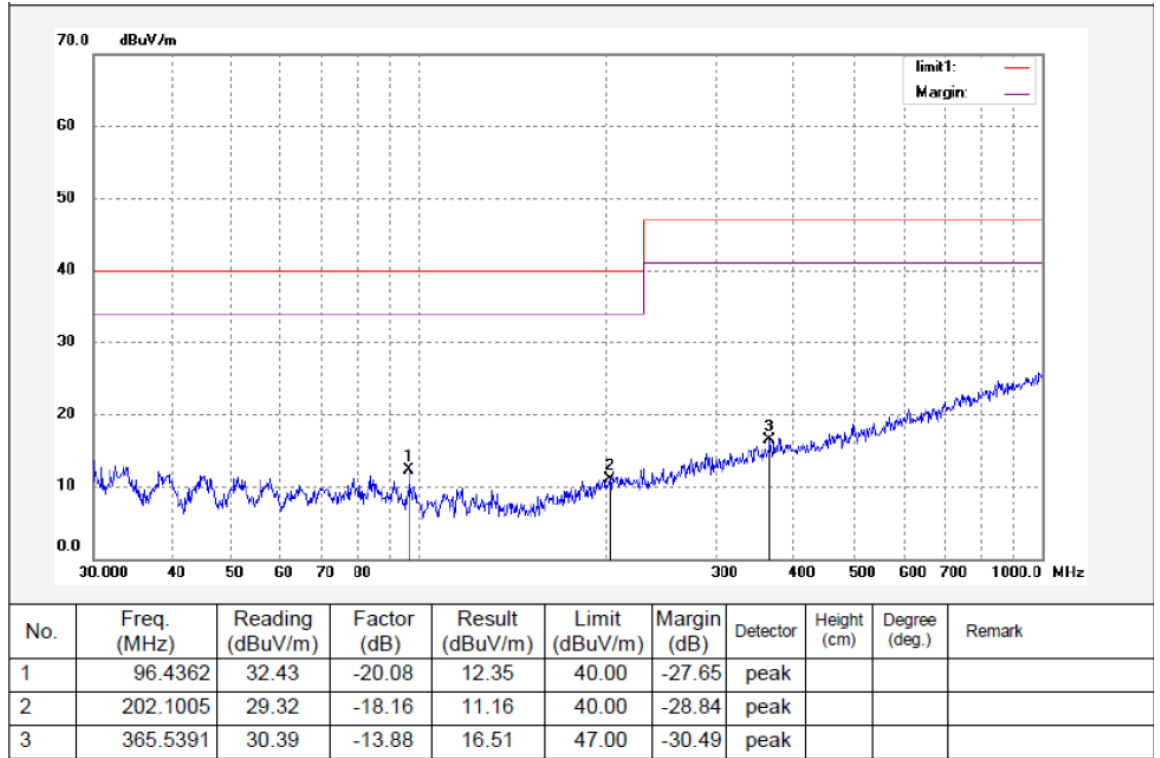
The frequency range from 30MHz to 1000MHz is investigated.

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	191.7450	29.08	-18.80	10.28	40.00	-29.72	peak			
2	352.9433	30.67	-14.14	16.53	47.00	-30.47	peak			
3	455.9058	36.04	-12.53	23.51	47.00	-23.49	peak			

Vertical



Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

5. ELECTROSTATIC DISCHARGE IMMUNITY TEST

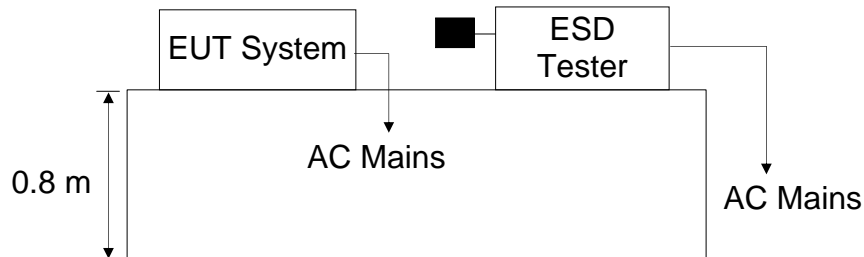
5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and Load



(EUT: Ride meter)

5.1.2. Block diagram of ESD test setup



(EUT: Ride meter)

5.2. Test Standard

EN 61326-1: 2013, EN 61326-2-2: 2013 (IEC61000-4-2: 2008
Severity Level: 3 / Air Discharge: $\pm 8\text{kV}$, Level: 2 / Contact Discharge: $\pm 4\text{kV}$)
Testing shall also be satisfied at the lower levels

5.3. Severity Levels and Performance Criterion

5.3.1. Severity level

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

5.3.2. Performance Criterion: **B**

5.4.EUT Configuration

The configuration of EUT is listed in Section 4.4.

5.5.Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 4.5 except the test set up replaced by Section 5.1.

5.6.Test Procedure

5.6.1.Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

5.6.2.Contact Discharge:

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

5.6.3.Indirect discharge for horizontal coupling plane:

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

5.6.4.Indirect discharge for vertical coupling plane:

At least 20 single 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.

5.7.Test Results

PASS

Please refer to the following page.

Electrostatic Discharge Test Results

Accurate Technology Co., Ltd.

Applicant: UNI-TREND TECHNOLOGY (CHINA) LIMITED <hr/> EUT: Ride meter <hr/> M/N: UT312 <hr/> Test Mode: On <hr/> Air discharge: ±2kV, ±4kV, ±8kV <hr/> Contact discharge: ±2kV, ±4kV	Test Date: October 19, 2015 <hr/> Temperature: 25°C <hr/> Humidity: 50% <hr/> Power supply: DC 9V <hr/> Criterion: B <hr/> Test Engineer: Star	
Location	Kind A-Air Discharge C-Contact Discharge	Result
Non-conductive Enclosure	A	PASS
Conductive Enclosure	C	PASS
Function key	A	PASS
HCP	C	PASS
VCP of front	C	PASS
VCP of rear	C	PASS
VCP of left	C	PASS
VCP of right	C	PASS
Remark :	Test Equipment : ESD Simulator (HAEFELY, PESD1610)	

6. RF FIELD STRENGTH SUSCEPTIBILITY TEST

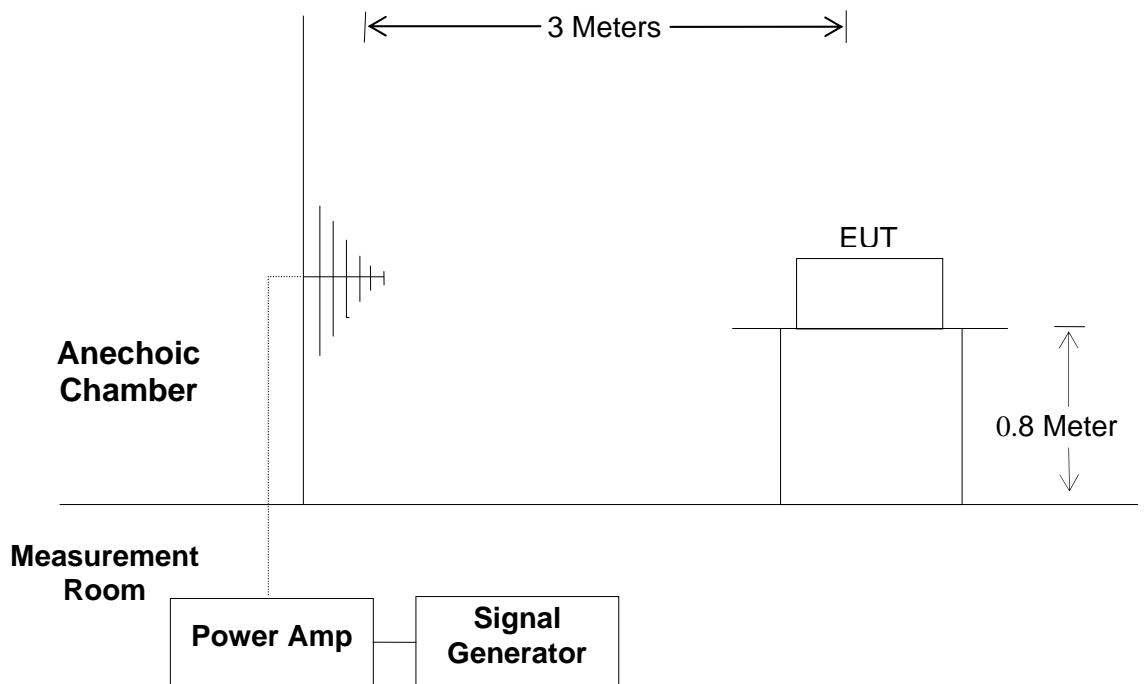
6.1. Block Diagram of Test

6.1.1. Block diagram of connection between the EUT and Load



(EUT: Ride meter)

6.1.2. Block diagram of R/S test setup



(EUT: Ride meter)

6.2. Test Standard

EN 61326-1: 2013, EN 61326-2-2: 2013

(IEC61000-4-3: 2010, Severity Level: 3, 1V/m; Severity Level: 2, 3V/m)

6.3. Severity Levels and Performance Criterion

6.3.1. Severity Levels

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

6.3.2. Performance Criterion : A

6.4. EUT Configuration on Test

The configuration of the EUT is same as Section 4.4.

6.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 4.5 except the test setup replaced as Section 6.1.

6.6. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark
1. Fielded Strength	1V/m, 3V/m
2. Radiated Signal	Unmodulated
3. Scanning Frequency	80-1000MHz, 1.4GHz-2.7GHz
4. Sweep time of radiated	0.0015 Decade/s
5. Dwell Time	1 Sec.

6.7. Test Results

PASS.

Please refer to the following page.

RF Field Strength Susceptibility Test Results

Accurate Technology Co., Ltd.

Applicant: UNI-TREND TECHNOLOGY (CHINA) LIMITED	Test Date: October 19, 2015
EUT: Ride meter	Temperature: 25°C
M/N: UT312	Humidity: 50%
Field Strength: 1V/m, 3V/m	Criterion: A
Power Supply: DC 9V	Frequency Range: 80-1000MHz 1400-2700MHz
Test Mode: On	Test Engineer: SMQ
Modulation: <input type="checkbox"/> None <input type="checkbox"/> Pulse <input checked="" type="checkbox"/> AM 1kHz 80%	
	Frequency Range 1: 80-1000MHz (3V/m) Frequency Range 2: 1400-2000MHz (3V/m) Frequency Range 3: 2000-2700MHz (1V/m)
Steps	# / % # / %
	Horizontal Vertical Horizontal Vertical
Front	PASS PASS PASS PASS
Right	PASS PASS PASS PASS
Rear	PASS PASS PASS PASS
Left	PASS PASS PASS PASS
Test Equipment : 1. Signal Generator : SMT03 (Rohde & Schwarz) 2. Power Amplifier : 150W1000 (A&R) 3. Bilog Antenna : CBL6111C (Chase)	
Note:	

7. PHOTOGRAPHS

7.1. Photo of Radiation Emission Measurement



7.2. Photo of EUT





