

EMC

TEST REPORT

Report No.: TS08100065-EME**Model No.:** 37XR-A**Issued Date:** Jan. 12, 2009**Applicant:** FLUKE CORP.
6920 Seaway Blvd, M/S 266D Everett, WA 98203 U.S.A.**Test Method/
Standard:** EN 61326-1: 2006
EN 61000-3-2: 2006
EN 61000-3-3: 1995+A1: 2001+A2: 2005**Test By:** Intertek Testing Services Taiwan Ltd.
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1. General Information

1.1 Identification of The EUT

Product: Digital Multimeter

Model No.: 37XR-A

Rated Power: DC 9 V from battery

Power Cord: N/A

Data Cable: N/A

Sample receiving date: Sep. 23, 2008

Testing date: Oct. 15, 2008 ~ Jan. 08, 2009

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Note 2: The test report only allows to be revised within three years from its original issued date unless further standard or the requirement was noticed.

Note 3: When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional Information About The EUT

The EUT is a Digital Multimeter. It has to fulfill the requirements of CISPR 11 emission relevant standards.

For more detail features, please refer to user's Manual.

1.3 Peripherals Equipment

Resistance × 1

2. Test Summary

<i>Emission (EN 61326-1: 2006)</i>			
Standard	Test Type	Result	Remarks
CISPR 11: 2003 Class B	Radiated Test	PASS	Pass by -8.59 dB at 784.700 MHz with antenna polarization Vertical

<i>Immunity (EN 61326-1: 2006)</i>				
Standard	Test Type	Result	Performance Criteria	Test Judgment
IEC 61000-4-2: 1995 +A1: 1998 +A2: 2000	ESD test	PASS	Criterion B	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006 +A1: 2007	RS test	PASS	Criterion A	Meets the requirements of Performance Criterion A

Remark:

The EUT has been tested/evaluated and pass the above standards without modification.

3. Test Specifications

3.1 Standards

EN 61326-1: 2006 Electrical equipment for measurement, control and laboratory use
— EMC requirements Part 1: General requirements.

EN 61000-3-2:2006 Electromagnetic compatibility- Part 3. Limits
Section 2. Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3: 1995+A1: 2001+A2: 2005 Electromagnetic compatibility - Part 3.
Limits Section 3. Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A

CISPR 11: 2003 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

Since the EUT is not connected to AC source, directly the tests are not applicable for it. The following test items were exempted based on engineering judgment.

- EN 61000-3-2 Harmonic test
- EN 61000-3-3 Flicker test
- IEC 61000-4-4 EFT test
- IEC 61000-4-5 Surge test
- IEC 61000-4-6 CS test
- IEC 61000-4-11 Dip test

3.2 Mode of operation during the test

The EUT was supplied with DC 9 V from battery and tested in resistance function mode.

3.3 Performance criteria

The performance criterias listed below are based on those regulated in the standard, specified by the manufacturer or derived from the product specification.

Criteria A:

During testing, normal performance within the specification limits.

Criteria B:

During testing, temporary degradation, or loss of function or performance which is self-recovering.

Criteria C:

During testing, temporary degradation, or loss of function or performance which requires operator intervention or system reset occurs.

4. CISPR 11 Radiated Emission Test

4.1 Operating Environment

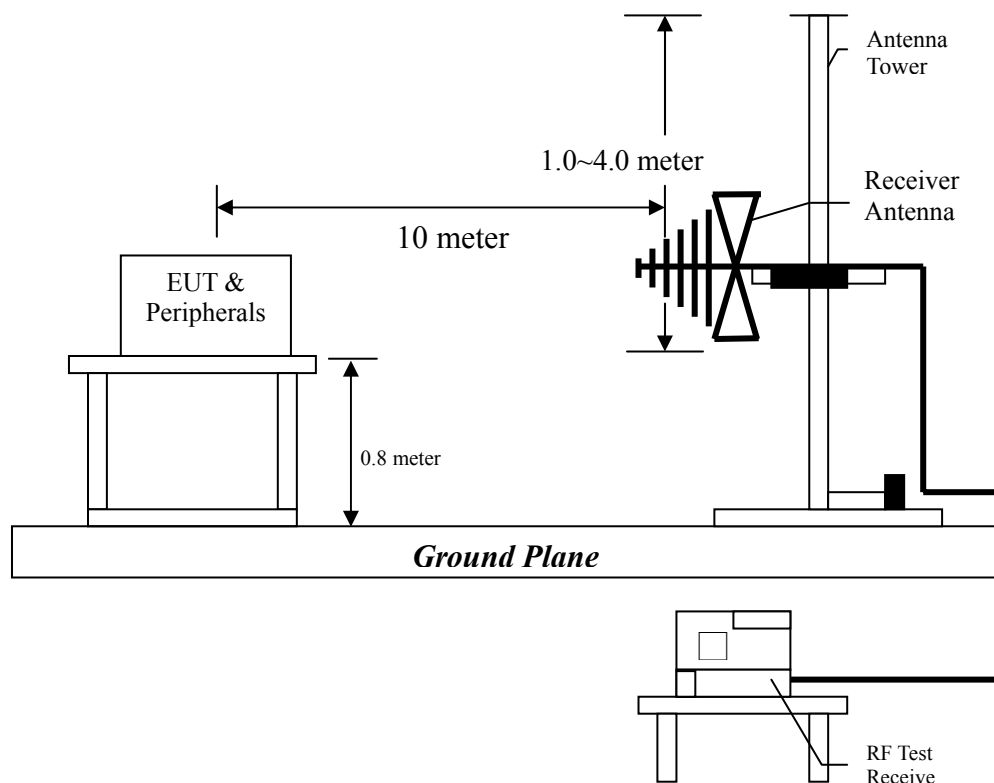
Temperature: 25 °C

Atmospheric Pressure: 1023 hPa

Relative Humidity: 50 %

Test Voltage: DC 9 V from battery

4.2 Test Procedure



Radiated testing was performed at an 10 meter open area test site.

The equipment under test were placed on a turntable top 0.8meter above ground.

The table was 360 degrees to determine the position of the highest radiation.

EUT is set 10 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna was set to conduct the measurement.

The bandwidth was set on the EMI meter 120 kHz.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

4.3 Test Equipment

Equipment	Brand	Model No.
EMI Receiver	Rohde & schwarz	ESCS30
Bilog Antenna	Schaffner	CBL6112B

Note: The above equipments are within the valid calibration period.

4.4 Radiated Emission Limit

Frequency (MHz)	Distance(m)	Class A	Class B
30~230	10	40	30
230~1000	10	47	37

Note:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closet point of EUT.

4.5 Uncertainty of Radiated Emission

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.68 dB.

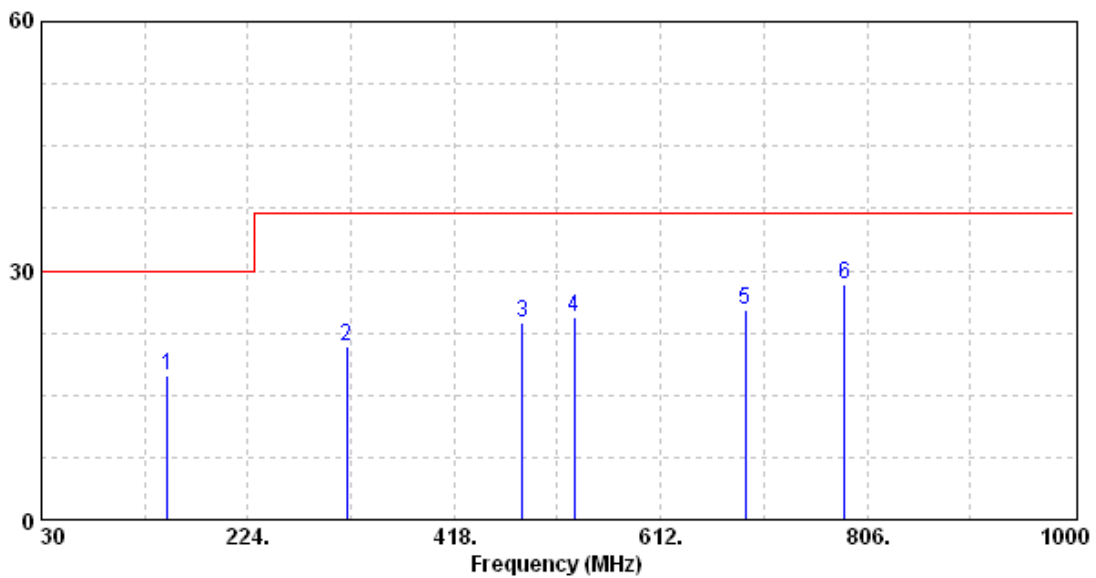
4.6 Radiated Emission Test Data

Polarity: Vertical
 Model No.: 37XR-A
 Test Condition: Resistance function mode

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
148.30	VERTICAL	13.17	4.10	17.27	30.00	-12.73	QP
317.10	VERTICAL	18.07	2.80	20.87	37.00	-16.13	QP
482.00	VERTICAL	22.11	1.70	23.81	37.00	-13.19	QP
530.50	VERTICAL	23.63	0.70	24.33	37.00	-12.67	QP
691.50	VERTICAL	24.88	0.40	25.28	37.00	-11.72	QP
784.70	VERTICAL	26.31	2.10	28.41	37.00	-8.59	QP

Remark:

1. Level (dB μ V/m) = Factor (dB/m) + Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line (dB μ V/m)

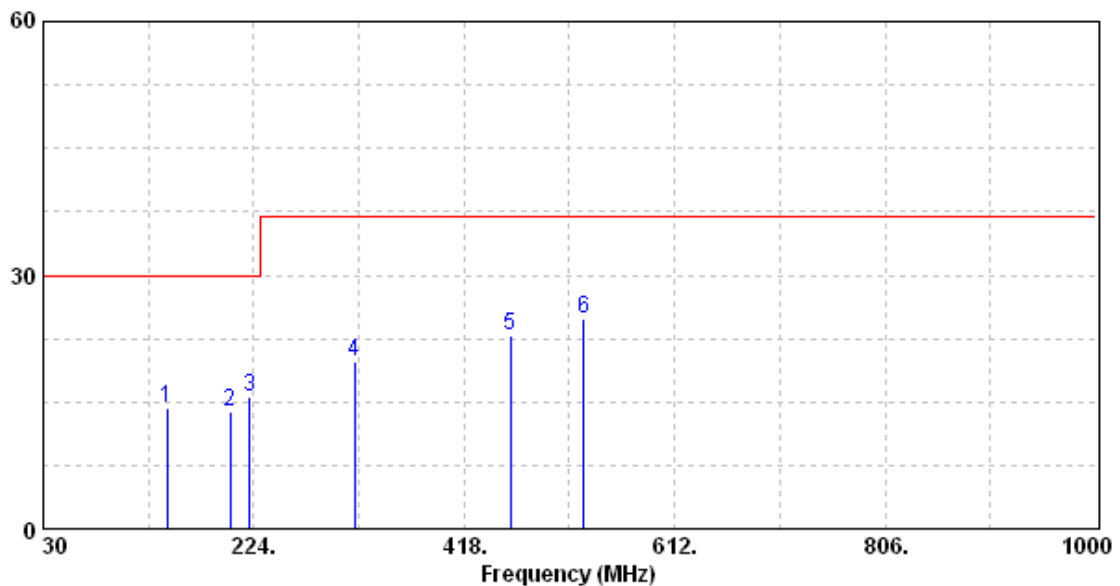


Polarity: Horizontal
 Model No.: 37XR-A
 Test Condition: Resistance function mode

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
144.50	HORIZONTAL	13.48	0.80	14.28	30.00	-15.72	QP
202.70	HORIZONTAL	12.41	1.40	13.81	30.00	-16.19	QP
220.10	HORIZONTAL	12.55	3.10	15.65	30.00	-14.35	QP
317.10	HORIZONTAL	18.07	1.70	19.77	37.00	-17.23	QP
460.70	HORIZONTAL	21.92	0.90	22.82	37.00	-14.18	QP
528.60	HORIZONTAL	23.54	1.20	24.74	37.00	-12.26	QP

Remark:

1. Level (dB μ V/m) = Factor (dB/m) + Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line (dB μ V/m)



5. IEC 61000-4-2 Electrostatic Discharge Immunity Test

5.1 Operating Environment

Temperature: 25 °C Atmospheric Pressure: 1023 hPa
Relative Humidity: 55 % Test Voltage: DC 9 V from battery

5.2 Purpose

The object of the test is to evaluate the ESD immunity performance of EUT.

5.3 Test Set-Up

A horizontal coupling plane (HCP) was placed on a non-metallic table 0.8 m above a reference ground plane (RGP) and connected to it with a cable with two 470 k Ω resistors. The EUT was placed on an insulation sheet on the HCP and was operated according to the specified operating mode.

A vertical coupling plane (VCP) was connected to the RGP with a cable with two 470 k Ω resistors.

5.4 Test Conditions

Test level: Air discharge ----- +/- 8 kV
 Contact discharge ----- +/- 4 kV

Single discharge at 1 second interval positive discharge and negative discharge

5.5 Test Equipment

Equipment	Manufacturer	Model No.
Electrostatic Discharge System	NoiseKen	ESS-2002

Note: The above equipments are within the valid calibration period.

5.6 Test Result

Point of Discharge	Applied Voltage (kV)	Total No. of Discharge (Each Point)	Result	Criteria Level	Remark
Contact Test Point	±2	20	P	A	-
	±4	20	P	A	-
Air Test Point	±2	20	P	A	-
	±4	20	P	A	-
	±8	20	P	A	-
VCP (4 sides)	±2	20	P	A	-
	±4	20	P	A	-
HCP (4 sides)	±2	20	P	A	-
	±4	20	P	A	-

Description

Contact Discharge: <u>6</u> test points		Air Discharge	
<input checked="" type="checkbox"/>	Metallic Screws	<input type="checkbox"/>	Plastic Screws
<input type="checkbox"/>	Metallic Case	<input checked="" type="checkbox"/>	Plastic Case (gap)
<input type="checkbox"/>	Metallic Connect ports	<input checked="" type="checkbox"/>	Plastic Connect ports
<input type="checkbox"/>	Metallic Junctions	<input checked="" type="checkbox"/>	Plastic Junctions
<input type="checkbox"/>	Others:	<input type="checkbox"/>	LED indicator
		<input type="checkbox"/>	Panel Board
		<input type="checkbox"/>	Others:

Note: 1. "P" means the EUT pass the test.

Note: 2. "-" means not applicable

6. IEC 61000-4-3 Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

6.1 Operating Environment

Temperature: 23 °C Atmospheric Pressure: 1023 hPa
Relative Humidity: 53 % Test Voltage: DC 9 V from battery

6.2 Purpose

This test method subjects the EUT to a power source of disturbance comprising electric and magnetic field, simulating those coming from intentional RF transmitters.

6.3 Test Set-Up

The EUT was placed on a non-metallic table 0.8 meter above the reference ground plane (RGP) and was operated according to its specified operating mode.

Ferrite tiles/absorbers were placed on the RGP between the EUT and the antenna to reduce the reflections from the RGP. The EUT and its cables were exposed for the electromagnetic field for 1.5m vertically and 1.5m horizontally.

The distance between antenna and EUT is 3 meter.

6.4 Test Conditions

Test level	Test field strength V/m	Modulation
1	1	1 kHz 80% AM
2	3	1 kHz 80% AM
3	10	1 kHz 80% AM
X	Special	1 kHz 80% AM

The frequency steps : 1% , Log sweep
Dwell time : 3 sec
Frequency range : 80 MHz~1GHz, 1.4 GHz~2 GHz, 2 GHz~2.7 GHz
Test ports : Enclosure port
Test field strength : 1 V/m & 3 V/m

6.5 Test Equipment

Equipment	Manufacture	Model No.
An-echoic chamber 7m×3m×3m	Comtest Instrumentation	9708093
RF signal Generator	Marconi	2023B
Dual Band RF Power Amplifier	Kalmus	757LCB
High Power Microwave Amplifier Series	MILMEGA	AS0102-30
Bi-log Antenna	EMCO	3141
RF Power Meter	Boonton	4230
Power Sensor	Boonton	51011-EMC
Power Sensor	Boonton	51011-EMC
Field Probe	Holaday	HI-4422

Note: The above equipments are within the valid calibration period.

6.6 Generation of The Electromagnetic Field

The electromagnetic field is generated from a computer controlled signal generator. The output power is amplified and then radiated from broadband log periodic antennas. For each sweep a pre-recorded empty chamber calibration file is used to establish the required field strength. When using these files the field strength inside an area of 1.5/1.0 m x 1.5m is in accordance with the standard.

6.7 Test Results

Exposed Side: Front Left Rear Right

H: Horizontal V: Vertical

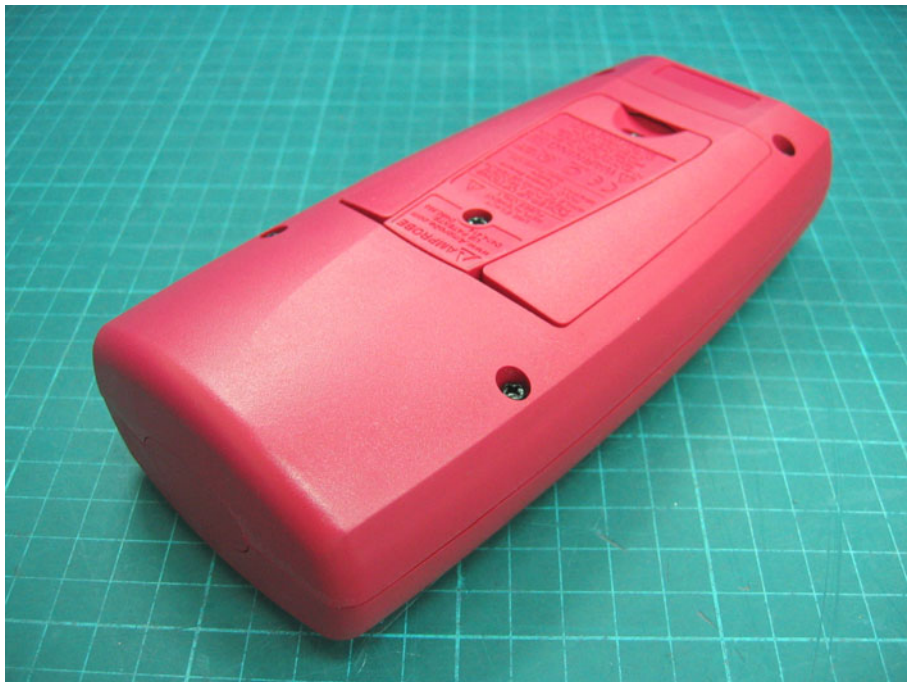
Frequency (MHz)	Horizontal/Vertical	Result	Criteria Level	Remark
80 MHz to 1 GHz	H	P	A	3 V/m
80 MHz to 1 GHz	V	P	A	3 V/m
1.4 GHz to 2 GHz	H	P	A	3 V/m
1.4 GHz to 2 GHz	V	P	A	3 V/m
2 GHz to 2.7 GHz	H	P	A	1 V/m
2 GHz to 2.7 GHz	V	P	A	1 V/m

Note: 1. "P" means the EUT pass the test.

Note: 2. "-" means not applicable

Appendix A1: External photo of EUT





Appendix B1: Radiated Emission Test Set-up

