



Test Report

Product Name	Wireless Pen
Model No.	PEN2A, PEN23, PEN27
FCC ID.	M35PEN2X

Applicant	UC-Logic Technology Corp.
Address	2F-9, No. 14, Lane 609, Sec. 5, Chung Hsing Rd., San-Chung City, Taipei Hsien, Taiwan, R.O.C.

Date of Receipt	Dec. 23, 2009
Issued Date	Feb. 12, 2010
Report No.	09C418R-RFUSP38V01-A
Report Version	V1.0

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

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Applicant	UC-Logic Technology Corp.
Address	2F-9, No. 14, Lane 609, Sec. 5, Chung Hsing Rd., San-Chung City, Taipei Hsien, Taiwan, R.O.C.
Manufacturer	UC-Logic Technology Corp.
Model No.	PEN2A, PEN23, PEN27
FCC ID.	M35PEN2X
EUT Rated Voltage	DC 1.5V (Power by Battery)
EUT Test Voltage	DC 1.5V (Power by Battery)
Trade Name	UC-Logic
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003
Test Result	Complied



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Documented By :

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(Engineering Adm. Specialist /
Rita Huang)



Tested By :

A handwritten signature in blue ink that appears to read "Henk Huang".

(Engineer / Henk Huang)



Testing Laboratory

0914

Approved By :

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(Manager / Vincent Lin)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION.....	4
1.1. EUT Description	4
1.2. Test System Details.....	4
1.3. Configuration of Test System	5
1.4. EUT Exercise Software.....	5
1.5. Test Facility.....	6
2. Conducted Emission.....	7
2.1. Test Equipment	7
2.2. Test Setup.....	7
2.3. Limits	7
2.4. Test Procedure.....	8
2.5. Uncertainty.....	8
2.6. Test Result of Conducted Emission	9
3. Radiated Emission.....	10
3.1. Test Equipment	10
3.2. Test Setup.....	10
3.3. Limits	11
3.4. Test Procedure.....	12
3.5. Uncertainty.....	12
3.6. Test Result of Radiated Emission	13
4. EMI Reduction Method During Compliance Testing	17

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Pen
Trade Name	UC-Logic
Model No.	PEN2A, PEN23, PEN27
FCC ID.	M35PEN2X
Frequency Range	250kHz
Type of Modulation	N/A
Type of antenna	Induction coil
Number of Channel	1

Frequency of Each Channel:

Channel	Frequency
1	250 kHz

Note:

1. The EUT is a Wireless Pen with a built-in 250kHz transmitter.
2. The EUT is including three models for different appearance.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is Wireless Pen with a built-in 250kHz transmitter. The operation frequency is from 250kHz. The signal will be transmitted through 250kHz RF signal from the Induction coil. DC 1.5V (Power by Battery) shall be provided for EUT operation.

Test Mode	Mode 1: Transmit
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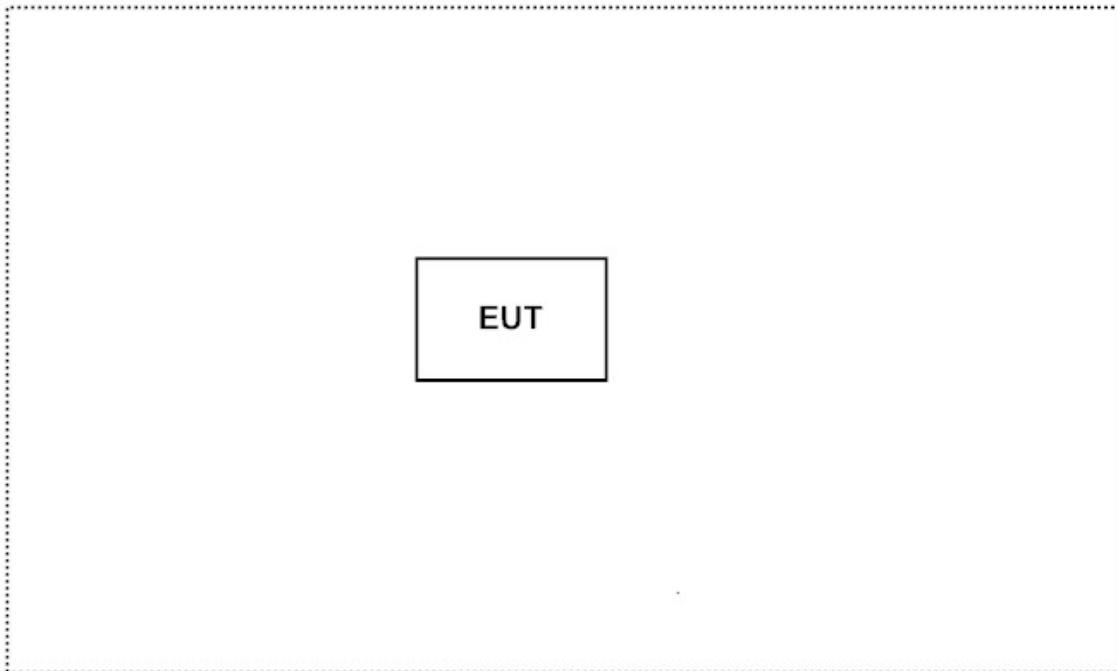
1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	N/A	N/A	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A	N/A

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.3.
- (2) Inserts the battery, start continuous transmit
- (3) Verify that the EUT works correctly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <http://tw.quietek.com/tw/emc/accreditations/accreditations.htm>

The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site :
<http://www.quietek.com/>

Site Description: Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195



Accreditation on NVLAP
NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
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FCC Accreditation Number: TW1014



2. Conducted Emission

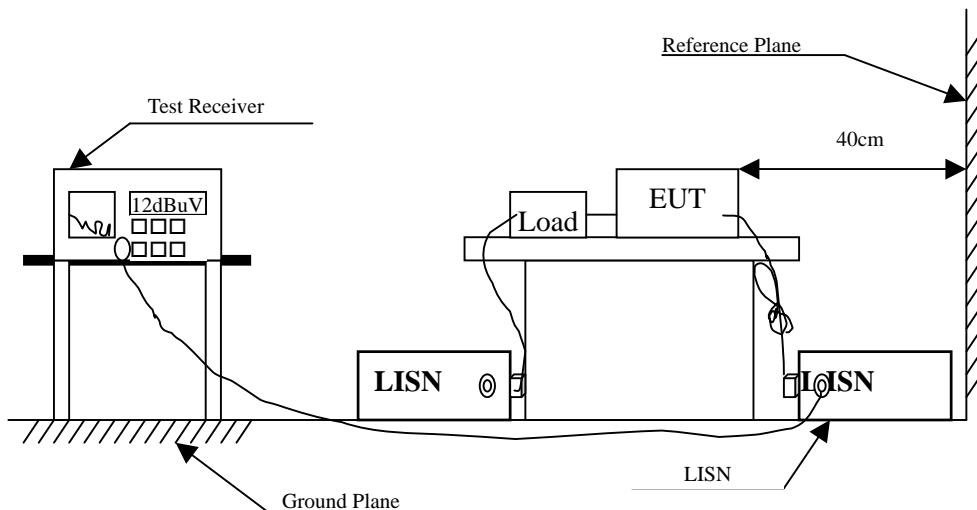
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/014	Feb., 2010	
2	L.I.S.N.	R & S	ESH3-Z5/825562/002	Feb., 2010	EUT
3	L.I.S.N.	R & S	ENV4200/848411/010	Feb., 2010	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2/100410	July, 2009	
5	No.1 Shielded Room				N/A

Note: All equipments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart B Paragraph 15.107 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

3. Radiated Emission

3.1. Test Equipment

The following test equipment are used during the radiated emission test:

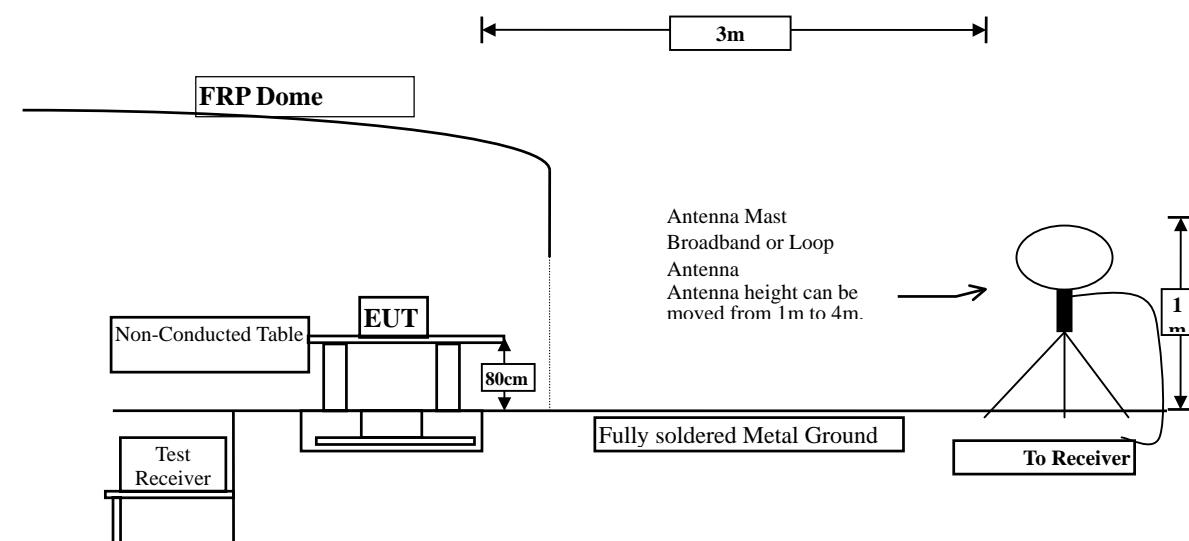
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Loop Antenna		Teseq	HLA6120 / 26739	Jul., 2009
	X Bilog Antenna		Schaffner Chase	CBL6112B/2673	Sep., 2009
	X Horn Antenna		Schwarzbeck	BBHA9120D/D305	Sep., 2009
	X Horn Antenna		Schwarzbeck	BBHA9170/208	Jul., 2009
	X Pre-Amplifier		Agilent	8447D/2944A09549	Sep., 2009
	X Spectrum Analyzer		Agilent	E4407B / US39440758	May, 2009
	X Test Receiver		R & S	ESCS 30/ 825442/018	Sep., 2009
	X Coaxial Cable		QuiTek	QTK-CABLE/ CAB5	Feb., 2010
	X Controller		QuiTek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch		Anritsu	MP59B/6200265729	N/A

Note:

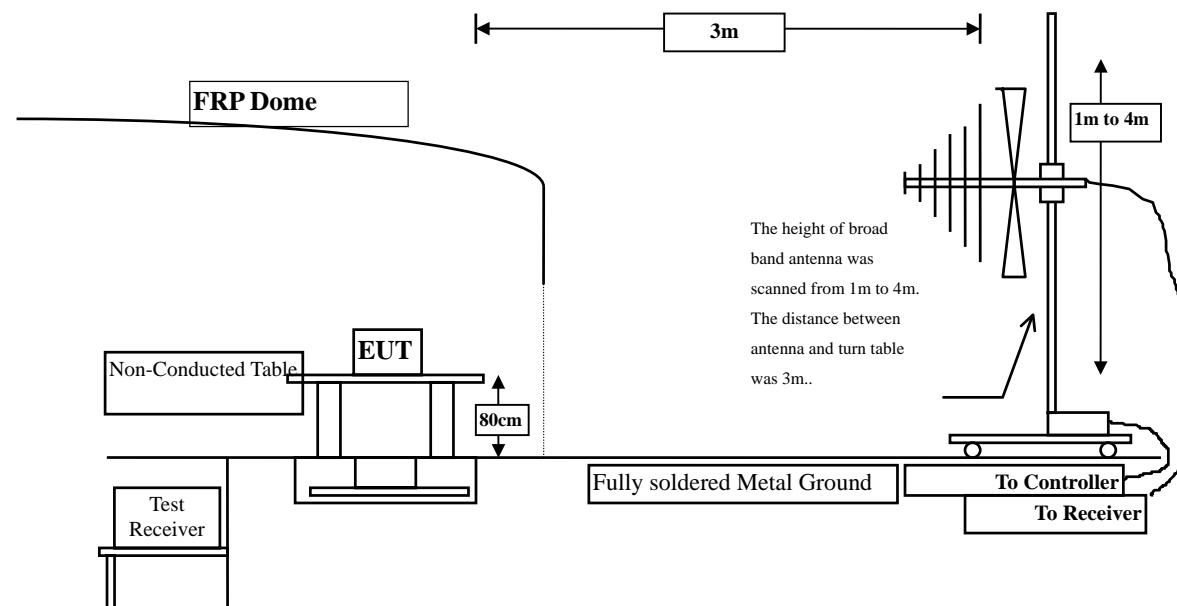
1. All equipments are calibrated every one year.
2. The test equipments marked by “X” are used to measure the final test results.

3.2. Test Setup

Under 30MHz Test Setup



Radiated Emission Below 1GHz



3.3. Limits

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400/F(kHz)	300
0.490 - 1.705	24,000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Remarks :

1. RF Voltage (dBuV) = $20 \log \text{RF Voltage (uV)}$
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : Wireless Pen
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

X Axis

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
0.255	19.600	11.160	30.760	-80.038	110.798

Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters (300 meters transform 3 meters), using the square of an inverse linear distance extrapolation factor (40dB/decade).

Product : Wireless Pen
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

Y+Z Axis

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m

0.255	19.600	11.240	30.840	-79.958	110.798
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Note:

1. Measurement Level = Reading Level + Correct Factor.
2. Correct Factor = Antenna Factor + Cable Loss – PreAMP.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters (300 meters transform 3 meters), using the square of an inverse linear distance extrapolation factor (40dB/decade).

Product : Wireless Pen
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

LOOP ANTENNA

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit
					dBuV/m
1.696	19.540	3.000	22.540	-40.554	63.094
2.128	19.610	3.550	23.160	-46.380	69.540
3.665	19.700	1.360	21.060	-48.480	69.540
11.000	19.940	0.000	19.940	-49.600	69.540
14.500	20.080	3.260	23.340	-46.200	69.540
25.000	19.900	-1.500	18.400	-51.140	69.540

Note:

1. The reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz.
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The EUT was positioned such that the distance from antenna to the EUT was 3 meters (300 or 30 meters transform 3 meters), using the square of an inverse linear distance extrapolation factor (40dB/decade).

Product : Wireless Pen
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
576.232	3.094	22.166	25.261	-20.739	46.000
661.764	3.821	23.089	26.910	-19.090	46.000
790.060	4.671	22.665	27.335	-18.665	46.000
840.601	4.600	21.946	26.546	-19.454	46.000
904.750	4.156	23.456	27.612	-18.388	46.000
961.122	5.214	23.162	28.376	-25.624	54.000
Vertical					
496.533	-1.819	23.006	21.187	-24.813	46.000
642.325	1.415	22.635	24.049	-21.951	46.000
723.968	1.660	21.005	22.665	-23.335	46.000
803.667	3.113	23.796	26.909	-19.091	46.000
893.086	5.095	22.361	27.457	-18.543	46.000
955.291	5.930	23.192	29.122	-16.878	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs