Test Report

Product Name ： Digitizer PEN
Model No. ： GREEN PEN
FCC ID. ： UBBGPEN

Applicant ： WALTOP International Corp.
Address ： 6F,No.19-1 Industry E.Rd.IV,Hsinchu Science Park,Hsin-Chu 30077,Taiwan,R.O.C.

Date of Receipt ： 2009/08/24
Issued Date ： 2009/09/09
Report No. ： 098433R-RFUSP38V01
Version ： V1.0

Test Report Certification

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Report No. : 098433R-RFUSP38V01

Product Name	: Digitizer PEN
Applicant	: WALTOP International Corp.
Address	: 6F,No.19-1 Industry E.Rd.IV,Hsinchu Science Park,Hsin-Chu 30077,Taiwan,R.O.C.
Manufacturer	: Shanghai Hank wireless Co., Ltd
Model No.	: GREEN PEN
FCC ID.	: UBBGPEN
Rated Voltage	: DC 1.5V (Power by Battery)
Trade Name	: WALTOP
Applicable Standard	: FCC CFR Title 47 Part 15 Subpart C 15.209: 2008
Test Result	: Complied

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.

Documented By : Carol Tsai
(Carol Tsai / Engineering Adm. Assistant)

Reviewed By : Lucia Lu
(Lucia Lu / Engineer)

Approved By : Roy Wang
(Roy Wang / Manager)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Digitizer PEN
Trade Name	WALTOP
Model No.	GREEN PEN
FCC ID	UBBGPEN
EUT Voltage	DC 1.5V
Frequency Range	130~169 KHz
Channel Number	2
Antenna Type	Integratd Loop Antenna

Frequency of Each Channel:

Channel	Frequency
Channel 1:	135KHz
Channel 2:	168KHz

Note:

1. This device is a 130~169 kHz device included a 135 kHz and 168 kHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209.

1.3. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
TX	Mode1: Transmit
Final Test Mode	
TX	Mode1: Transmit

Emission	
Performed Item	Test
Conducted Emission	No
Radiated Emission	Yes

1.4. Tested System Details

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

N/A

1.5. Configuration of tested System

Connection Diagram

1.6. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.5.
2	Enable RF signal and confirm EUT active.
3	Modulate output capacity of EUT up to specification.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	ANSI.C63.4 CE	15 - 35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	ANSI.C63.4 RE	15 -35	25
Humidity (%RH)		25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

August 30, 2007 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520

Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2010

Testing Laboratory
0914

Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2009

NVLAP Lab Code : 200347-0

Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwan, R.O.C.
TEL : 886-3-592-8858 / FAX : 886-3-592-8859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

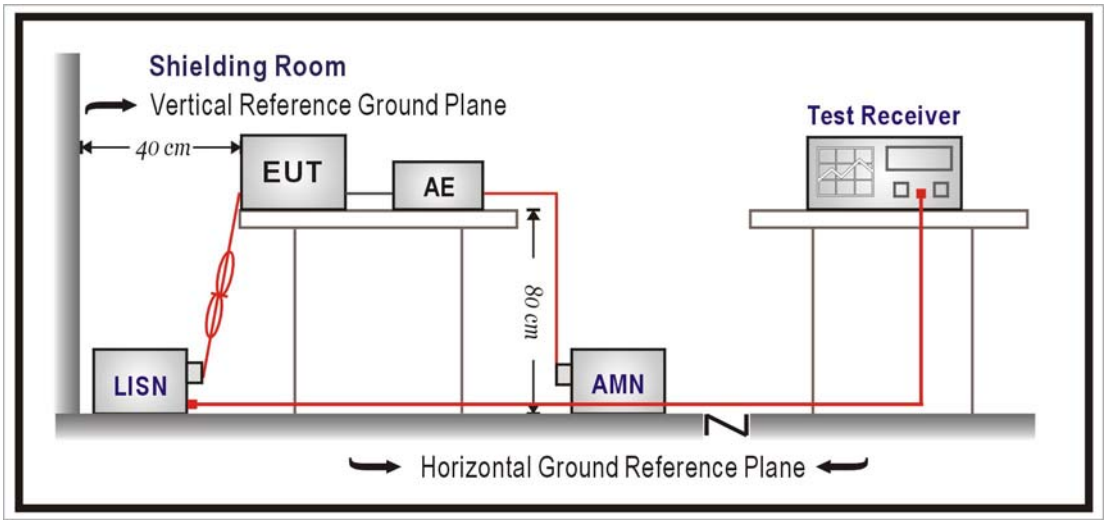
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
4-Wire ISN	R & S	ENY 41	837032/001	2009/04/15
Artificial Mains Network	R & S	ENV4200	848411/010	2009/03/13
Double 2-Wire ISN	R & S	ENY 22	835354/008	2009/04/15
LISN	R & S	ESH3-Z5	825562/002	2009/03/31
Pulse Limiter	R & S	ZSH3Z2	357.8810.54	2009/07/19
Test Receiver	R & S	ESCS 30	100122	2009/02/21

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	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 refer 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 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2008

2.6. Test Result

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

3. Radiated Emission

3.1. Test Equipment

The following test equipments are used during the test:

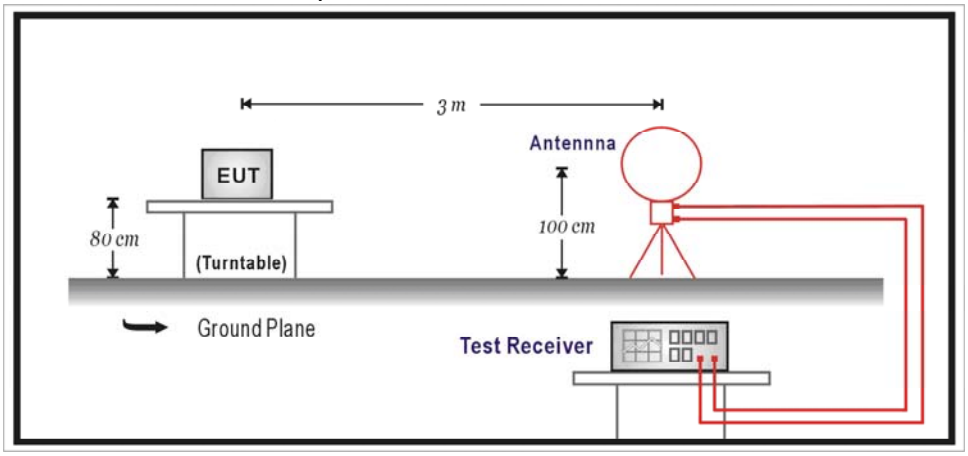
Radiated Emission / CB1

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2895	2008/09/03
Loop Antenna	R & S	HFH2-Z2	833799/004	2008/09/13
Pre-Amplifier	Quietek	AP-025C	CHM0608021	2008/11/13
Spectrum Analyzer	R & S	FSP40	100005	2009/08/25
Test Receiver	R & S	ESCS 30	825442/017	2009/02/03

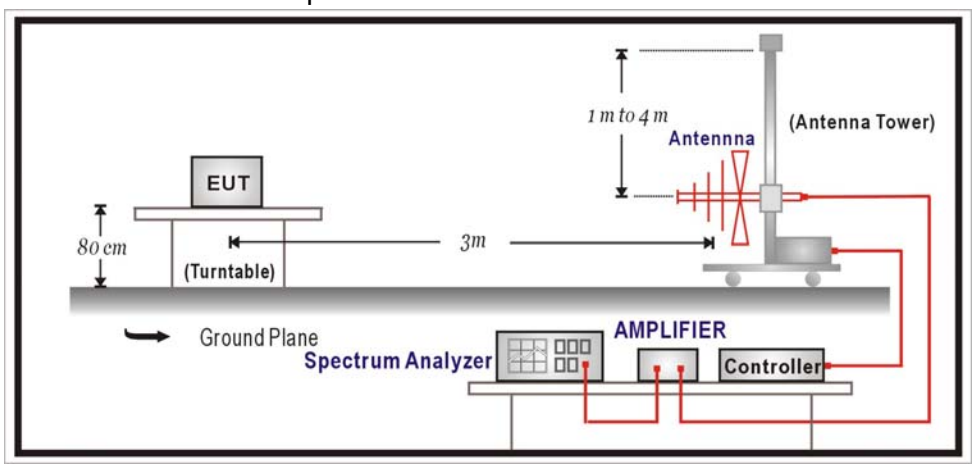
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark “X” test instruments are used to measure the final test results.

3.2. Test Setup

Under 30MHz Test Setup:



Under 1GHz Test Setup:



3.3. Limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark[1]	300
0.490-1.705	24000/F(kHz)	See Remark[1]	30
1.705-30	30	29.54	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log 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.

4. When the very low emission of EUT, the 3m measurement distance was performed. Regards to an inverse linear extrapolation 40dB/dec is adopted.

3.4. Test Procedure

Under 30MHz Test:

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 electric field strength. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna which is 1.0 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

The emission limit shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limit in these three bands are based on measurements employing an average detector.

Under 1GHz Test:

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 antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

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.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.209: 2008

3.6. Test Result

Product	Digitizer PEN		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2009/08/28	Test Site	CB1

(135kHz)

Horizontal				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Average Limit (dBuV/m)**
X-axis				
0.135	0.29	43.11	43.40	105.00
Y-axis				
0.135	0.29	34.23	34.52	105.00
Z-axis				
0.135	0.29	31.62	31.91	105.00
Horizontal (X-axis)				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Quasi-Peak Limit (dBuV/m)**
0.921	0.29	25.52	25.81	68.32
5.795	0.29	24.79	25.08	69.54
9.746	0.29	24.30	24.59	69.54
13.697	0.29	24.38	24.67	69.54
23.838	0.29	24.51	24.80	69.54
29.106	0.29	23.98	24.27	69.54

Note:

1. The Reading Levels are Average detector for the frequency bands 9–90kHz, 110–490 kHz and above 1000 MHz,and the others are QuasiPeak detector.
2. Measurement Level = Reading Level + Correct Factor.
3. 0.009 - 0.490 MHz , Limit(dBuV/m) = 20 log (2400 / F(kHz)) + 40 log (300m / 3m)
4. 0.490 - 1.705 MHz , Limit(dBuV/m) = 20 log (24000 / F(kHz)) + 40 log (30m / 3m)
5. 1.705 - 30.0 MHz , Limit(dBuV/m) = 20 log (30 uV/m) + 40 log (30m / 3m)

Product	Digitizer PEN		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2009/08/28	Test Site	CB1

(135kHz)

Vertical				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Average Limit (dBuV/m)**
X-axis				
0.135	0.29	42.72	43.01	105.00
Y-axis				
0.135	0.29	33.85	34.14	105.00
Z-axis				
0.135	0.29	31.24	31.53	105.00
Vertical (X-axis)				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Quasi-Peak Limit (dBuV/m)**
0.921	0.29	25.26	25.55	68.32
5.795	0.29	24.67	24.96	69.54
9.746	0.29	24.40	24.69	69.54
13.697	0.29	24.51	24.80	69.54
23.838	0.29	24.38	24.67	69.54
29.106	0.29	24.21	24.50	69.54

Note:

1. The Reading Levels are Average detector for the frequency bands 9–90kHz, 110–490 kHz and above 1000 MHz,and the others are QuasiPeak detector.
2. Measurement Level = Reading Level + Correct Factor.
3. 0.009 - 0.490 MHz , Limit(dBuV/m) = 20 log (2400 / F(kHz)) + 40 log (300m / 3m)
4. 0.490 - 1.705 MHz , Limit(dBuV/m) = 20 log (24000 / F(kHz)) + 40 log (30m / 3m)
5. 1.705 - 30.0 MHz , Limit(dBuV/m) = 20 log (30 uV/m) + 40 log (30m / 3m)

Product	Digitizer PEN		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2009/08/28	Test Site	CB1

(168kHz)

Horizontal				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Average Limit (dBuV/m)**
X-axis				
0.168	0.29	44.03	44.32	103.10
Y-axis				
0.168	0.29	40.31	40.60	103.10
Z-axis				
0.168	0.29	39.65	39.94	103.10
Horizontal (X-axis)				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Quasi-Peak Limit (dBuV/m)**
1.015	0.29	25.50	25.79	67.47
5.750	0.29	24.91	25.20	69.54
9.809	0.29	24.28	24.57	69.54
13.699	0.29	24.30	24.59	69.54
23.846	0.29	24.38	24.67	69.54
29.258	0.29	24.51	24.80	69.54

Note:

1. The Reading Levels are Average detector for the frequency bands 9–90kHz, 110–490 kHz and above 1000 MHz,and the others are QuasiPeak detector.
2. Measurement Level = Reading Level + Correct Factor.
3. 0.009 - 0.490 MHz , Limit(dBuV/m) = 20 log (2400 / F(kHz)) + 40 log (300m / 3m)
4. 0.490 - 1.705 MHz , Limit(dBuV/m) = 20 log (24000 / F(kHz)) + 40 log (30m / 3m)
5. 1.705 - 30.0 MHz , Limit(dBuV/m) = 20 log (30 uV/m) + 40 log (30m / 3m)

Product	Digitizer PEN		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2009/08/28	Test Site	CB1

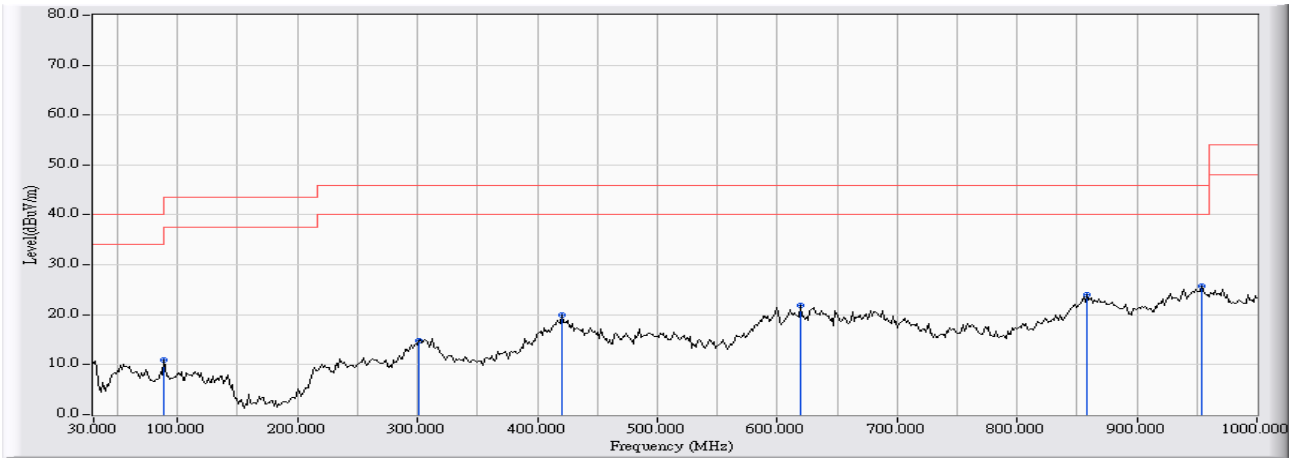
(168kHz)

Vertical				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Average Limit (dBuV/m)**
X-axis				
0.168	0.29	43.60	43.89	103.10
Y-axis				
0.168	0.29	40.00	40.29	103.10
Z-axis				
0.168	0.29	39.60	39.89	103.10
Vertical (X-axis)				
Frequency (MHz)	**Cable Loss (dB)**	**Reading Level (dBuV)**	**Emission Level (dBuV/m)**	**Quasi-Peak Limit (dBuV/m)**
1.015	0.29	25.39	25.68	67.47
5.750	0.29	24.70	24.99	69.54
9.809	0.29	24.38	24.67	69.54
13.699	0.29	24.30	24.59	69.54
23.846	0.29	24.41	24.70	69.54
29.258	0.29	24.30	24.59	69.54

Note:

1. The Reading Levels are Average detector for the frequency bands 9–90kHz, 110–490 kHz and above 1000 MHz, and the others are QuasiPeak detector.
2. Measurement Level = Reading Level + Correct Factor.
3. 0.009 - 0.490 MHz , Limit(dBuV/m) = 20 log (2400 / F(kHz)) + 40 log (300m / 3m)
4. 0.490 - 1.705 MHz , Limit(dBuV/m) = 20 log (24000 / F(kHz)) + 40 log (30m / 3m)
5. 1.705 - 30.0 MHz , Limit(dBuV/m) = 20 log (30 uV/m) + 40 log (30m / 3m)

Site : CB1	**Time : 2009/08/28 - 16:28**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : FCC_30-1G(2009) - HORIZONTAL	**Power : DC 1.5V**
EUT : Digitizer PEN	**Note : 135kHz**

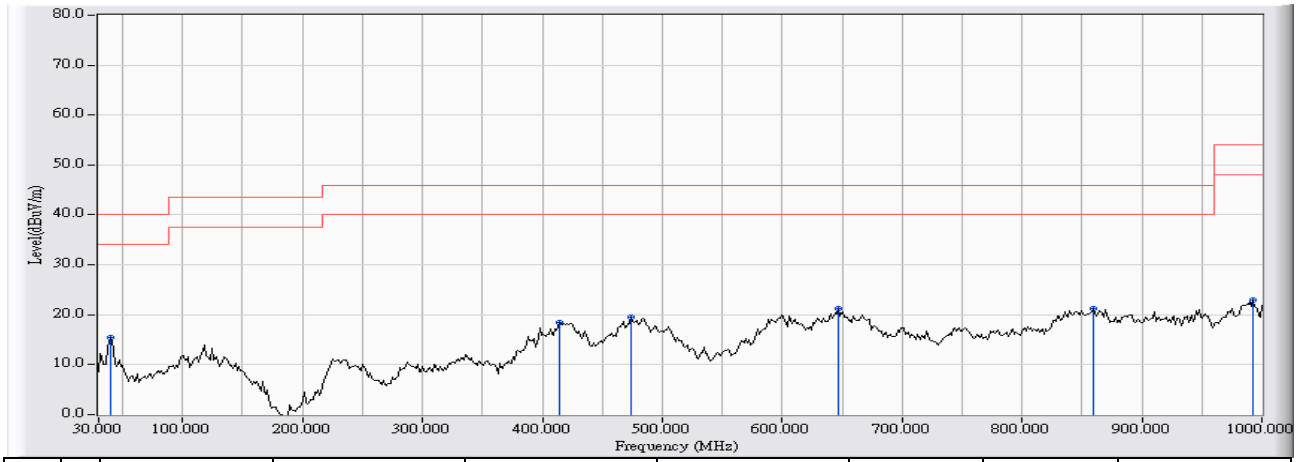


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		89.043	-15.463	26.467	11.004	-32.496	43.500	QUASIPEAK
2		301.319	-8.662	23.504	14.841	-31.159	46.000	QUASIPEAK
3		420.812	-4.441	24.349	19.907	-26.093	46.000	QUASIPEAK
4		619.029	-2.899	24.721	21.823	-24.177	46.000	QUASIPEAK
5		858.014	0.284	23.645	23.929	-22.071	46.000	QUASIPEAK
6	*	953.609	2.256	23.380	25.635	-20.365	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2009/08/28 - 16:30**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : FCC_30-1G(2009) - VERTICAL	**Power : DC 1.5V**
EUT : Digitizer PEN	**Note : 135kHz**

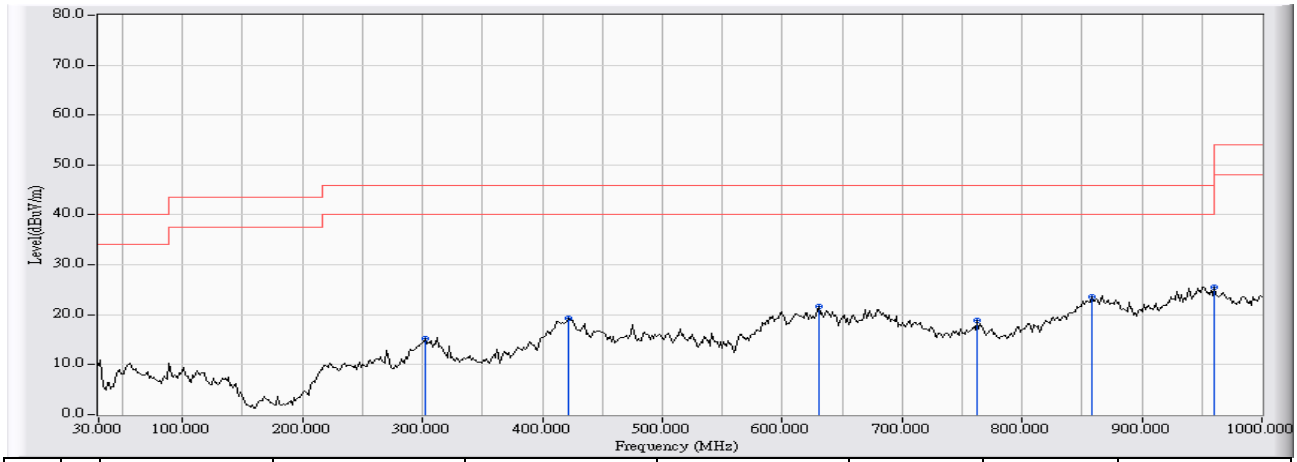


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	39.841	-8.990	24.326	15.336	-24.664	40.000	QUASIPEAK
2		413.783	-5.124	23.618	18.493	-27.507	46.000	QUASIPEAK
3		474.232	-3.696	23.260	19.564	-26.436	46.000	QUASIPEAK
4		647.145	-2.875	24.187	21.312	-24.688	46.000	QUASIPEAK
5		859.420	-2.385	23.674	21.290	-24.710	46.000	QUASIPEAK
6		992.971	-0.555	23.468	22.913	-31.087	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2009/08/28 - 16:01**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : FCC_30-1G(2009) - HORIZONTAL	**Power : DC 1.5V**
EUT : Digitizer PEN	**Note : 168kHz**

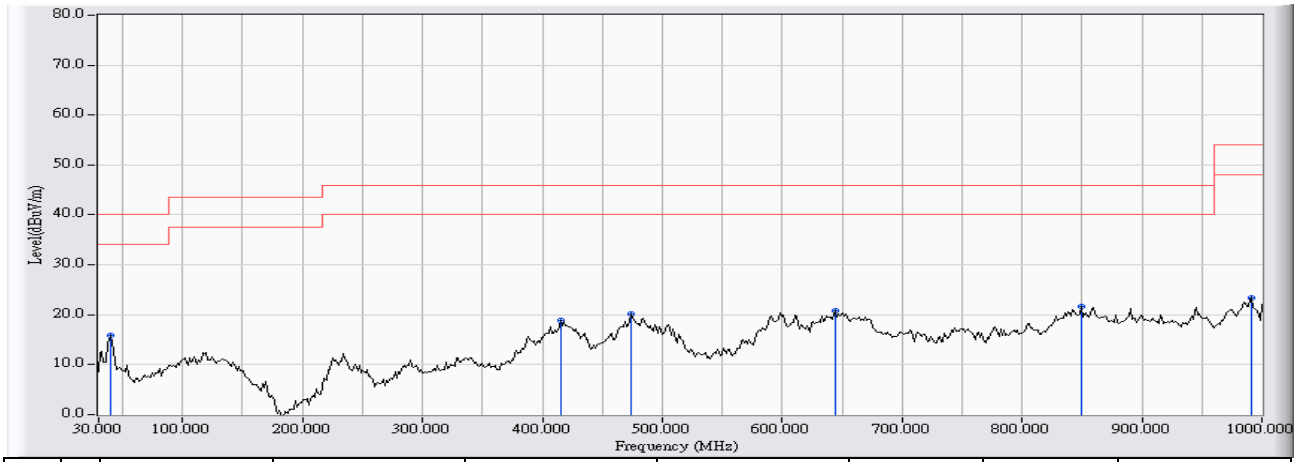


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		302.725	-8.489	23.758	15.270	-30.730	46.000	QUASIPEAK
2		422.217	-4.468	23.854	19.387	-26.613	46.000	QUASIPEAK
3		630.275	-2.213	23.786	21.573	-24.427	46.000	QUASIPEAK
4		762.420	-5.063	24.044	18.981	-27.019	46.000	QUASIPEAK
5	*	858.014	0.284	23.334	23.618	-22.382	46.000	QUASIPEAK
6		960.638	1.354	24.236	25.589	-28.411	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : CB1	**Time : 2009/08/28 - 16:04**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : FCC_30-1G(2009) - VERTICAL	**Power : DC 1.5V**
EUT : Digitizer PEN	**Note : 168kHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	39.841	-8.990	24.892	15.902	-24.098	40.000	QUASIPEAK
2		415.188	-4.631	23.497	18.867	-27.133	46.000	QUASIPEAK
3		474.232	-3.696	23.836	20.140	-25.860	46.000	QUASIPEAK
4		644.333	-2.946	23.705	20.759	-25.241	46.000	QUASIPEAK
5		849.580	-2.237	23.950	21.713	-24.287	46.000	QUASIPEAK
6		991.565	-0.426	23.749	23.322	-30.678	54.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor