

FCC TEST REPORT

 REPORT NO.:
 RF130711D14A

 MODEL NO.:
 CTH-301, CTH-301XXXXXX

 FCC ID:
 HV4CTH301

 RECEIVED:
 Aug. 7, 2013

 TESTED:
 Aug. 8, 2013

 ISSUED:
 Aug. 9, 2013

APPLICANT: Wacom Co., Ltd.

ADDRESS: 2-510-1 Toyonodai Kazo-shi, Saitama Japan 349-1148

- **ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
- **LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED	
RF130711D14A	Original release	Aug. 9, 2013	



CERTIFICATION 1

PRODUCT: USB Touch Pad with Stylus BRAND: Wacom MODEL NO.: CTH-301, CTH-301XXXXXXX (X may be alphanumeric / Symbol or blank) APPLICANT: Wacom Co., Ltd. TESTED: Aug. 8, 2013 **TEST SAMPLE:** ENGINEERING SAMPLE STANDARDS: FCC Part 15, Subpart C (Section 15.209), ANSI C63.10-2009

The above equipment has been tested by Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : 4

re Chang (Annie Chang / Supervisor)

DATE: Aug. 9, 2013

Cen Lin, DATE: Aug. 9, 2013 APPROVED BY :

(Ken Liu / Senior Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C							
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK				
15.207	Conducted Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is –12.97dB at 0.61484MHz				
15.209	Radiated Emission Test	PASS	Meet the requirement of limit. Minimum passing margin is -6.1dB at 775.93MHz.				

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	UNCERTAINTY
Conduced emissions	2.41 dB
Radiated emissions	4.30 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	USB Touch Pad with Stylus
MODEL NO.	CTH-301, CTH-301XXXXXXX
POWER SUPPLY	5.0Vdc from host equipment
MODULATION TYPE	АМ
CARRIER FREQUENCY OF EACH CHANNEL	531.25kHz, 562.5kHz, 593.75kHz
NUMBER OF CHANNEL	3
ANTENNA TYPE	Internal antenna
DATA CABLE	Shielded USB cable (1.0m)
I/O PORT	N/A
ACCESSORY DEVICES	Refer to note below

NOTE:

- 1. The EUT is a USB Touch Pad with Stylus. The EUT is the ideal tool to enhance your presentations and documents.
- 2. The EUT contains following accessory devices:

Product	Brand	Model	
Stylus	Wacom	UP-7721	

3. <u>All models are electrically identical, different model names are for marketing purpose.</u>

MODEL NO.			
CTH-301			
CTH-301XXXXXXX			
(X may be alphanumeric / Symbol or blank)			

For the test, **model: CTH-301** was selected as the representative model for the test, and therefore only its data was recorded in this report.

4. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 DESCRIPTION OF TEST MODES

3 channels were provided to this EUT

Channel	Frequency (kHz)
1	531.25
2	562.50
3	593.75



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT	-	Applicable to			Description	
MODE	-	PLC	RE<1G		Description	
-		\checkmark	\checkmark	-		
Where PLC:	NDUCTEI	D EMISSION	TEST:	es ig ke: ka	diated Emission below TGHZ	
Pre-Scan has between avai architecture).	s been cor ilable mod	iducted to de ulations axis	termine the wo and antenna p	orst-case m orts (if EUT	ode from all possible col with antenna diversity	
Following cha	annel(s) w	as (were) sel	ected for the fi	nal test as l	isted below.	
AVAILABLE (CHANNEL	TESTED CI	HANNEL			
1 to 3	3	2				
RADIATED	EMISSION channel(s CHANNEL	N TEST (BEL) was (were) TESTED CH/ 2	.OW 1 GHZ): selected for th	e final test	as listed below.	
EST CONDITION	<u>l:</u> ENVIR CON	ONMENTAL	INPUT P (SYST	OWER EM)	TESTED BY	
PLC	26deg.	C, 76% RH	120Vac,	60Hz	Joey Liu	

RE<1G

26deg. C, 76% RH

120Vac, 60Hz

Dalen Dai



3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	BW33YM1	FCC DoC Approved

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.209) ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO. SERIAL NO		CALIBRATED DATE	CALIBRATED UNTIL	
ROHDE &					
SCHWARZ	ESCS 30	100276	Jan. 07, 2013	Jan. 06, 2014	
TEST RECEIVER					
ROHDE & SCHWARZ					
Artificial Mains Network	ESH3-Z5	100219	Nov. 28, 2012	Nov. 27, 2013	
(for EUT)					
LISN With Adapter		C104da 001	Nov. 28, 2012	Nov. 27, 2013	
(for EUT)	ADTO	CTUAUA-001			
ROHDE & SCHWARZ					
Artificial Mains Network	ESH3-Z5	100218	Dec. 05, 2012	Dec. 04, 2013	
(for peripherals)					
Software	ADT_Cond_V7.3.7	NA	NA	NA	
Software	ADT_ISN_V7.3.7	NA	NA	NA	
RF cable (JYEBAO)	5D-FB	Cable-C10.01	Feb. 19, 2013	Feb. 18, 2014	
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Feb. 06, 2013	Feb. 05, 2014	

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The test was performed in Shielded Room No. 10.
- 3. The VCCI Site Registration No. C-1852.



4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit 20dB) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation



4.1.5 TEST SETUP



Note: Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Connected the USB Touch Pad with Stylus (EUT) to a notebook placed on a testing table.
- b. The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The Pen (EUT) sent messages to USB Touch Pad with Stylus (EUT) via wireless transmission.
- d. The Pen (EUT) sent messages to PC via USB Touch Pad with Stylus (EUT).
- e. Repeated steps c-d.



4.1.7 TEST RESULTS

6dB BANDWIDTH	9kHz	PHASE	Line 1
CHANNEL	2		

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB	(uV)]	[dB	(uV)]	[dB((uV)]	(d	B)
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.13	44.61	28.26	44.74	28.39	66.00	56.00	-21.26	-27.61
2	0.16953	0.14	41.37	24.26	41.51	24.40	64.98	54.98	-23.48	-30.59
3	0.18516	0.14	39.56	25.56	39.70	25.70	64.25	54.25	-24.55	-28.55
4	0.51328	0.17	40.21	26.65	40.38	26.82	56.00	46.00	-15.62	-19.18
5	0.61484	0.18	42.85	27.48	43.03	27.66	56.00	46.00	-12.97	-18.34
6	0.87656	0.19	37.58	24.09	37.77	24.28	56.00	46.00	-18.23	-21.72
7	18.01563	1.06	35.83	27.67	36.89	28.73	60.00	50.00	-23.11	-21.27

REMARKS:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission Level Limit value
- 4. Correction Factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





6dB BANDWIDTH	9kHz	PHASE	Line 2
CHANNEL	2		

1	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB	(uV)]	[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.11	43.44	26.16	43.55	26.27	65.79	55.79	-22.24	-29.52
2	0.43125	0.14	38.95	24.26	39.09	24.40	57.23	47.23	-18.14	-22.83
3	0.51328	0.14	39.64	26.95	39.78	27.09	56.00	46.00	-16.22	-18.91
4	0.65781	0.14	39.16	22.46	39.30	22.60	56.00	46.00	-16.70	-23.40
5	0.84922	0.15	36.14	22.92	36.29	23.07	56.00	46.00	-19.71	-22.93
6	18.10156	0.74	34.05	25.91	34.79	26.65	60.00	50.00	-25.21	-23.35

REMARKS:

- 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
- 2. The emission levels of other frequencies were very low against the limit.
- 3. Margin value = Emission Level Limit value
- 4. Correction Factor = Insertion loss + Cable loss
- 5. Emission Level = Correction Factor + Reading Value





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FOR FREQUENCY BELOW 30MHz

FREQUENCY	FIELD STREN	GTH (dBuV/m)	MEASUREMENT DISTANCE
(MHz)	uV/m dBuV/m		(meters)
0.009 - 0.490	2400 / F (kHz)	48.52-13.80	300
0.490 – 1.705	24000 / F (kHz)	33.80-22.97	30
1.705 - 30.0	30	29.54	30

FOR FREQUENCY BETWEEN 30-1000MHz

FREQUENCY	Class A	(at 10m)	Class B (at 3m)			
(MHz)	uV/m	dBuV/m	uV/m	dBuV/m		
30-88	90	39.1	100	40.0		
88-216	150	43.5	150	43.5		
216-960	210	46.4	200	46.0		
Above 960	300	49.5	500	54.0		



4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2013	Feb. 25, 2014
HP Preamplifier	8449B	3008A01201	Feb. 26, 2013	Feb. 25, 2014
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 03, 2013	Jan. 02, 2014
Schwarzbeck Antenna	VULB 9168	137	Mar. 20, 2013	Mar. 19, 2014
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2014
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V 7.6.15.9.2	NA	NA	NA
SUHNER RF cable	SF102	CABLE-CH6	Aug. 19, 2012	Aug. 18, 2013
Loop Antenna R & S	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.

- 2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3. The test was performed in Chamber No. 6.
- 4. The Industry Canada Reference No. IC 7450E-6.
- 5. The FCC Site Registration No. is 447212.



4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna's height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
- 2. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation



4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITION

Set the EUT under transmission/receiving condition continuously at specific channel frequency.



4.2.7 TEST RESULT

FREQUENCY RANGE	9 kHz ~ 30 MHz	DETECTOR FUNCTION	Average
CHANNEL	2		

	ANTENNA POLARITY & TEST DISTANCE: LOOP ANTENNA OPEN AT 3m										
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	Correction Factor (dB/m)			
1	*0.563	20.6 AV	72.6	-52.0	1.00 H	152	0.26	20.36			
2	1.1250	15.5 AV	66.6	-51.1	1.00 H	67	-5.20	20.68			
3	1.6875	16.7 AV	63.1	-46.4	1.00 H	198	-4.18	20.84			
	ANTE	ENNA POLA	RITY & TES	ST DISTANC	E: LOOP A	NTENNA CI	_OSE AT 3n	n			
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	Correction Factor (dB/m)			
1	*0.563	22.0 AV	72.6	-50.6	1.00 V	133	1.62	20.36			
2	1.1250	15.7 AV	66.6	-50.8	1.00 V	322	-4.94	20.68			
3	1.6875	16.9 AV	63.1	-46.1	1.00 V	271	-3.91	20.84			

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

4. Margin value = Emission Level – Limit value

5. " * ": Fundamental frequency.

6. Loop antenna was used for all radiated emission below 30MHz.

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

24000/562.5kHz	=42.7 uV/m	30m
	=32.6 dBuV/m	30m
	=32.6+20log(30/3) ²	3m
	=72.6 dBuV/m	



FREQUENCY RANGE	30-1000MHz	DETECTOR FUNCTION	Quasi-Peak
CHANNEL	2		

	ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M									
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	Correction Factor (dB/m)		
1	62.98	23.5 QP	40.0	-16.5	1.08 H	305	37.49	-14.01		
2	166.77	36.5 QP	43.5	-7.0	1.23 H	254	50.01	-13.51		
3	263.77	32.6 QP	46.0	-13.4	1.15 H	211	45.45	-12.84		
4	376.29	34.7 QP	46.0	-11.3	1.33 H	329	44.65	-9.93		
5	775.93	39.9 QP	46.0	-6.1	1.00 H	70	42.01	-2.12		
6	888.45	34.5 QP	46.0	-11.5	1.09 H	86	35.42	-0.88		
		ANTENNA		/ & TEST DI	STANCE: V	ERTICAL A	Т 3 М			
NO.	FREQ. (MHz)	EMISSION LEVEL	LIMIT (dBu)/(m)	MARGIN (dB)	ANTENNA		RAW VALUE			
		(dBuV/m)	(ubuv/iii)		HEIGHT (m)	(Degree)	(dBuV)	(dB/m)		
1	99.84	(dBuV/m) 28.6 QP	43.5	-14.9	HEIGHT (m) 1.66 V	(Degree)	(dBuV) 46.66	(dB/m) -18.04		
1	99.84 144.46	(dBuV/m) 28.6 QP 27.5 QP	43.5 43.5	-14.9 -16.0	HEIGHT (m) 1.66 V 1.27 V	(Degree) 121 187	(dBuV) 46.66 40.86	(dB/m) -18.04 -13.32		
1 2 3	99.84 144.46 391.81	(dBuV/m) 28.6 QP 27.5 QP 28.1 QP	43.5 43.5 46.0	-14.9 -16.0 -17.9	HEIGHT (m) 1.66 V 1.27 V 1.34 V	(Degree) 121 187 103	(dBuV) 46.66 40.86 37.78	(dB/m) -18.04 -13.32 -9.71		
1 2 3 4	99.84 144.46 391.81 527.61	(dBuV/m) 28.6 QP 27.5 QP 28.1 QP 28.5 QP	43.5 43.5 46.0 46.0	-14.9 -16.0 -17.9 -17.5	HEIGHT (m) 1.66 V 1.27 V 1.34 V 1.08 V	(Degree) 121 187 103 187	(dBuV) 46.66 40.86 37.78 35.41	-18.04 -13.32 -9.71 -6.91		
1 2 3 4 5	99.84 144.46 391.81 527.61 583.87	(dBuV/m) 28.6 QP 27.5 QP 28.1 QP 28.5 QP 28.7 QP	43.5 43.5 46.0 46.0 46.0	-14.9 -16.0 -17.9 -17.5 -17.3	HEIGHT (m) 1.66 V 1.27 V 1.34 V 1.08 V 1.00 V	(Degree) 121 187 103 187 321	(dBuV) 46.66 40.86 37.78 35.41 34.39	(dB/m) -18.04 -13.32 -9.71 -6.91 -5.70		

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)

- 3. The other emission levels were very low against the limit.
- 4. Margin value = Emission Level Limit value



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: <u>www.adt.com.tw/index.5/phtml</u>. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180 Fax: 886-2-26051924 Hsin Chu EMC/RF Lab: Tel: 886-3-5935343 Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab Tel: 886-3-3183232 Fax: 886-3-3270892

Email: <u>service.adt@tw.bureauveritas.com</u> Web Site: <u>www.bureauveritas-adt.com</u>

The address and road map of all our labs can be found in our web site also.



7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END----