

EMC TEST REPORT

Report No. : EME-010840

Model No. : TP-001

Issued Date : Nov. 12, 2001

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Test Engineer

Approved By

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1. General information

1.1 Identification of the EUT

Manufacturer	: Wintime Electronics Corp.
Product	: TransPen
Model No.	: TP-001
FCC ID.	: G54TP001PEN
Power Supply	: 1.5Vdc Button Cell Battery × 2
Power Cord	: N/A
Sample Received	: Oct. 16, 2001
Test Date(s)	: Oct. 16, 2001 to Oct. 22, 2001

A DOC report has been generated for the clinet.

1.2 Additional information about the EUT

The EUT is a TransPen, it's included for use with the TransPad.

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

1.3 Peripherals equipment

1. Keyboard

Product No. : FDA-104DA
Serial No. : N/A
Manufacturer : Forward

2. Monitor

Product No. : CM753ET
Serial No. : N/A
Manufacturer : HITACHI

3. PC

Product No. : 444
Serial No. : N/A
Manufacturer : IBM

4. PS2 Mouse

Product No. : M-S34
Serial No. : N/A
Manufacturer : HP

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.209.

2.2 Operation mode

EUT was operated and used two new button cell batteries. Power on PC, peripherals and TransPad, run the program “TTY.EXE” Press the tip of EUT lightly and fixed to perform all the tests.

Due to battery operation the conducted emission test was not performed.

2.3 Modifications required for compliance

No modification were installed during test performance to bring the product into compliance (Please note that this list does not include changes made specifically by Wintime Electronics Corp. Prior to compliance testing.)

2.4 Test equipment

Equipment	Brand	Model No.	Series No.
EMI Receiver	Rohde & Schwarz	ESCS 30	825788/014
EMI Receiver	Rohde & Schwarz	ESMI	825428/005
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	848.766/052
EMI Receiver	Rohde & Schwarz	ESCS 30	825788/014
EMI Spectrum	Rohde & Schwarz	ESMI	825428/005
Loop Antenna	Rohde & Schwarz	HFH2-Z2	830749/20
Bilog Antenna	SCHWARZBECK	VULB 9160	3111
Turn Table	HDGmbH	DS 420S	N/A
EMI Receiver	Rohde & Schwarz	ESH3	860156/018
Antenna Tower	HDGmbH	MA 240	240/573

Note:

1. The calibration interval of the above instruments is 12 months.

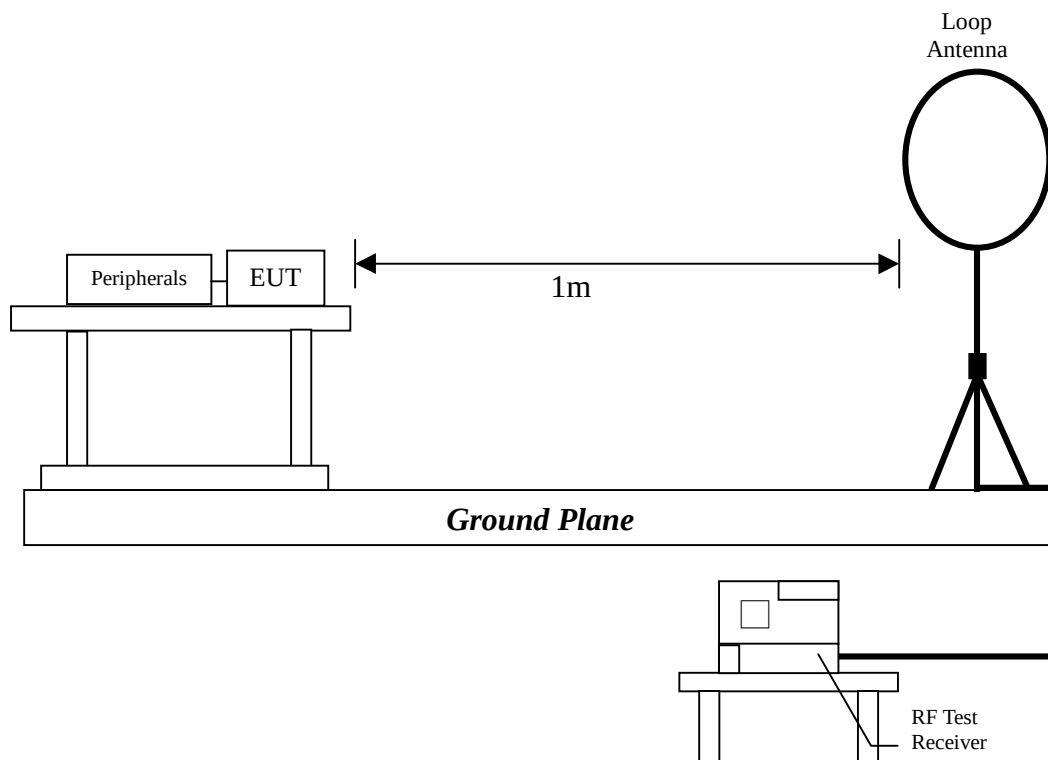
3. Radiated emission test

3.1 Operating environment

Temperature: 25 °C
Relative Humidity: 60 %

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The signal is maximized through rotation and placement in the three orthogonal axes. The EUT and its peripherals 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 1 meter.

In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4/1992 on radiated measurement. Radiated emission measurement were performed from 9kHz to 10th fundamental.

The bandwidth below 30 MHz setting on the field strength meter is 9kHz and above 30 MHz to 1GHz is 120kHz.

3.3 Emission limits

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

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part.

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81. In the General Radiated Emission Test, the uncertainty is within ± 2.5 dB

3.4 Limits calculation

We use two formulas below to calculate the reference distance between EUT and Loop Antenna in the band 0.009-0.490 and 0.490-1.705 MHz.

Formula 1.

$$20 \log (2400/F(\text{kHz})) + 40 \log (\text{Measurement distance} / \text{Reference distance})$$

-----for the band 0.009-0.490 MHz.

Formula 2.

$$20 \log (24000/F(\text{kHz})) + 40 \log (\text{Measurement distance} / \text{Reference distance})$$

-----for the band 0.490-1.705 MHz.

Example: Assume a EUT operating in 467 kHz, so the limit @ 1m is:

$$20 \log (2400/467) + 40 \log (300/1) = 113.3 \text{ dBuV}$$

3.5 Radiated emission test data

Worst case radiated emission at 0.934 MHz, margin: -31.28 dB

EUT : TP-001
Test Channel : N/A
Test Mode : Tx mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Factor (dB)	Corrected Reading (dBuV/m)	Limit At 1m (dBuV/m)	Margin (dB)
0.467	AV	-	59.40	0.10	59.50	113.30	-53.80
0.934	AV	-	55.90	0.10	56.00	87.28	-31.28
1.401	AV	-	49.10	0.00	49.10	83.76	-34.66
1.868	AV	-	36.80	0.00	36.80	88.63	-51.83
2.335	AV	-	43.80	0.00	43.80	88.63	-44.83
2.802	AV	-	40.00	0.00	40.00	88.63	-48.63
3.269	AV	-	41.20	0.00	41.20	88.63	-47.43
3.736	AV	-	36.60	0.00	36.60	88.63	-52.03
4.203	AV	-	34.40	0.00	34.40	88.63	-54.23
4.670	AV	-	39.40	0.00	39.40	88.63	-49.23
5.137	AV	-	31.24	0.00	31.24	88.63	-57.39

Remark:

1. Corrected Level = Reading Level(Including Antenna Factor) + Cable Loss
2. All Readings below 1GHz are Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.
4. “-” means the value was undetectable.
5. “*” means the emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

3.6 Radiated emission worst-case configuration photograph



Appendix A1: Outlook of EUT

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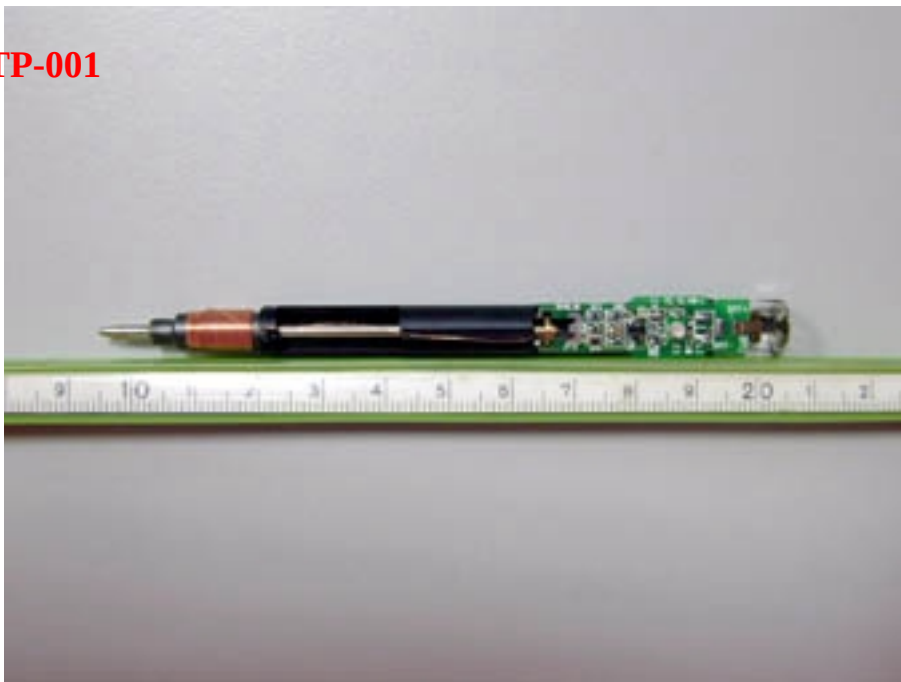


Appendix A2: Inner view of EUT

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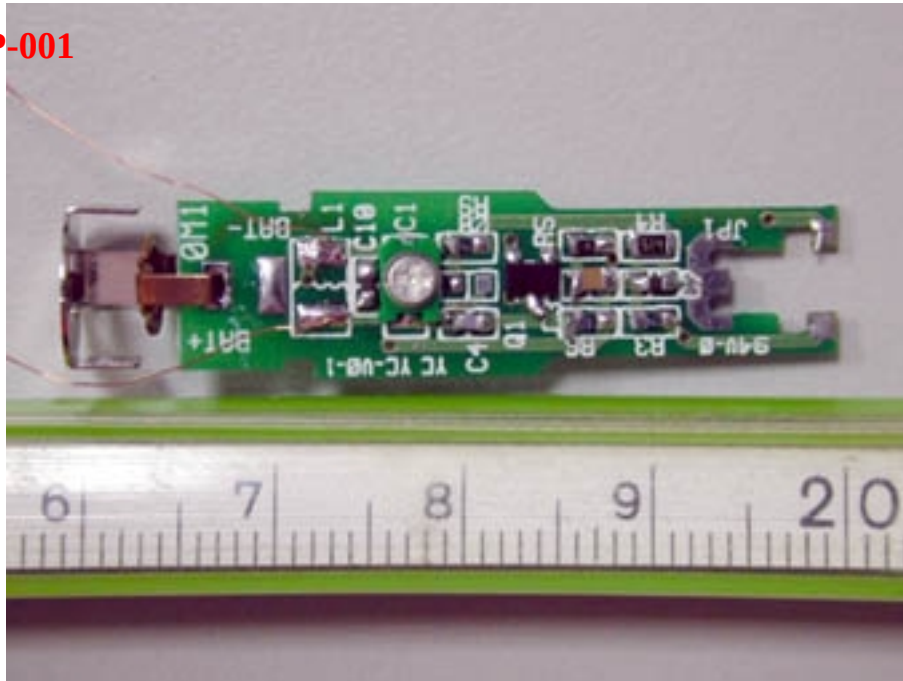


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Appendix A3: Inner view of EUT

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