Dynapro Technologies

Touchpro PD-40FA

Report of Measurements

per

FCC CFR47 Part 15/B

Revision 1.0

March 25, 2000

Prepared by:	**R.E.Stirling** Robert Stirling, P.Eng	**03/30/00** Date

Protocol Labs, Abbotsford B.C., Canada
FCC Registration Number 96437
Industry Canada Registration Number IC3384

Testing Details

TESTED BY: Robert Stirling

TEST CONDITIONS: Temperature and Humidity: 20 C, 40%

TEST VOLTAGE: 120 VAC, 60 Hz

Test Facilities

Protocol Labs
28945 McTavish Rd.
Abbotsford B.C., Canada, V4X 2E7

FCC Registration Number 96437
Industry Canada Registration Number IC3384

Test Equipment List:

Device	Model Number	Serial No.	Last Cal.	Next Cal
Antenna	EMCO 3141 Bilog	1127	18/12/98	18/06/00
LISN	Solar 8012-50-R-24-BNC	863092	02/18/00	02/18/01
Spectrum Analyzer	Hewlett Packard 8566B	2241A02102	12/21/99	12/21/00
RF-Preselector	Hewlett Packard 85685A	3107A01222	12/21/99	12/21/00
Quasi-Peak Adapter	Hewlett Packard 85650A	2043A00240	12/21/99	12/21/00
Tower	Rhientech Labs	Custom		
Turntable	Protocol	Custom		

Equipment Under Test:

The test system: **EUT** **Touchscreen Display Monitor**

Manufacturer Dynapro Technologies
Part Number PD-40FA
Serial Number ENG 01

HOST: Notebook PC

Manufacturer Compaq
Part Number Presario 1255
Serial Number 1V93CFK6226S

Cabling:

Cable	# of conductors	Shielded	Ferrite
Host Power Cable	2	No	Yes
EUT Power Cable	2	No	Yes
Serial Cable	9	Yes	No
VGA Cable	3	Yes	Yes - 2

Test Setup: The EUT and Host were interconnected by the cabling supplied with each unit, and the drivers were installed to active the touchscreen. It was determined that the worst case radiated emissions were using the 600 by 800 resolution setting. A test program was executed, which continuously scrolled a continual string of the ASCII characters '55' on the screen.

Summary of Testing:

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15B- Unintentional Radiators, and ICES 03 to Class B limits.

Both the Radiated and Power Line Conducted Emission tests were performed using measurement procedure outlined in the above standards.

Manufacturer's responsibilities

Markings

According to FCC Section 15.19, and ICES 003, a statement similar to the following must be included on an identification label, which also uniquely identifies the Manufactured date, either explicitly or through a Serial number etc:

> "This equipment complies with Part 15 of the FCC Rules, and Industry Canada's ICES 03 for a Class B Digital Device. Operation is subject to the following two conditions: 1) That this device does not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation."

Additionally, If the manufacturer markets product to Quebec, the following supplemental information should be added to the label :

> "Cet Apparreil numerique de la Classe B respecte toutes les exigences du Reglement sur le material broilleur du Canada."

Labeling

According to FCC Section 15.105, and ICES 003, the following statement must be included in a prominent location in the User's Manual:

> Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and ICES 03. These limits are designed to pro-vide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not in-stalled and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
> —Reorient or relocate the receiving antenna.
> —Increase the separation between the equipment and receiver.
> —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
> —Consult the dealer or an experienced radio/TV technician for help.

It is also required according to FCC Part B Section 15.21, that a caution be included such as:

> Caution: Changes or modifications to this equipment, not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Part 1: Conducted Emission Testing

DATE: February 20, 2000

TEST STANDARD: FCC CFR47, Part 15, Subpart B

RESOLUTION BANDWIDTH: 9 kHz

DEVICE DESCRIPTIONS: As described in the Equipment Under Test Section, above.

TEST SETUP: The EUT was connected to the conducted emissions LISN apparatus, and the host was connected to a second LISN, to provide isolation.

METHOD OF MEASUREMENT: Measurements were made using a spectrum analyzer with 10kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 10kHz bandwidth, CISPR Quasi-Peak detector.

CABLING DETAILS: The EUT was Set up using the manufacturer's specified normal cabling configuration.

MINIMUM STANDARD: Class B Limits:

Frequency (MHz)	Maximum Level (dBuV) Quasi-Peak	Maximum Level (dBuV) Average
0.45 – 30.0	61.0	58.0

MEASUREMENT DATA: See Appendix A for Plots, FCC Class B limits are Marked.

EMISSIONS DATA: See Tables 1 and 2 in Appendix A for corresponding frequencies.

PERFORMANCE: Complies.

Part 2: Radiated Emission Testing

DATE: February 20, 2000

TEST STANDARD FCC CFR47, Part 15, Subpart B

RESOLUTION BANDWIDTH: 120 kHz

DEVICE DESCRIPTIONS: Refer to the Equipment Under Test Section, above, for EUT Descriptions.

TEST SETUP: The equipment was set up in a 3 meter open area test site. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turn table to maximize the emissions signal strength and the results recorded on the attached plots.

CABLING DETAILS: The EUT was Set up using the manufacturer's specified normal cabling configuration.

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MINIMUM STANDARD: Class B Limits:

Frequency (MHz)	Maximum Field Strength dBuV/m at 3m
30 - 88	40
88 - 216	43.5
216 - 960	46.0
960 - 1000	54

MEASUREMENT DATA: See Appendix A for Plots, FCC Class B limits are marked.

EMISSIONS DATA: See Table 3, All Suspects and Table 4, Product Emissions in Appendix A, for corresponding frequencies.

Appendix A Measurement Data and Plots

Measurement Data

Table 1: Line 1 Conducted

Frequency (MHz)	Peak (dBuV)	DelLim-Peak (dB)
.481	33.9	-14.1
.535	33.5	-14.5
.591	32.5	-15.5
.782	32.2	-15.8
.515	32.1	-15.9

Table 2: Line 2 Conducted

Frequency (MHz)	Peak (dBuV)	DelLim-Peak (dB)
.782	36.1	-11.9
4.18	34.2	-13.8
3.99	33.9	-14.1
4.05	33.5	-14.5
4.1	33.3	-14.7

Table 3 All Suspects

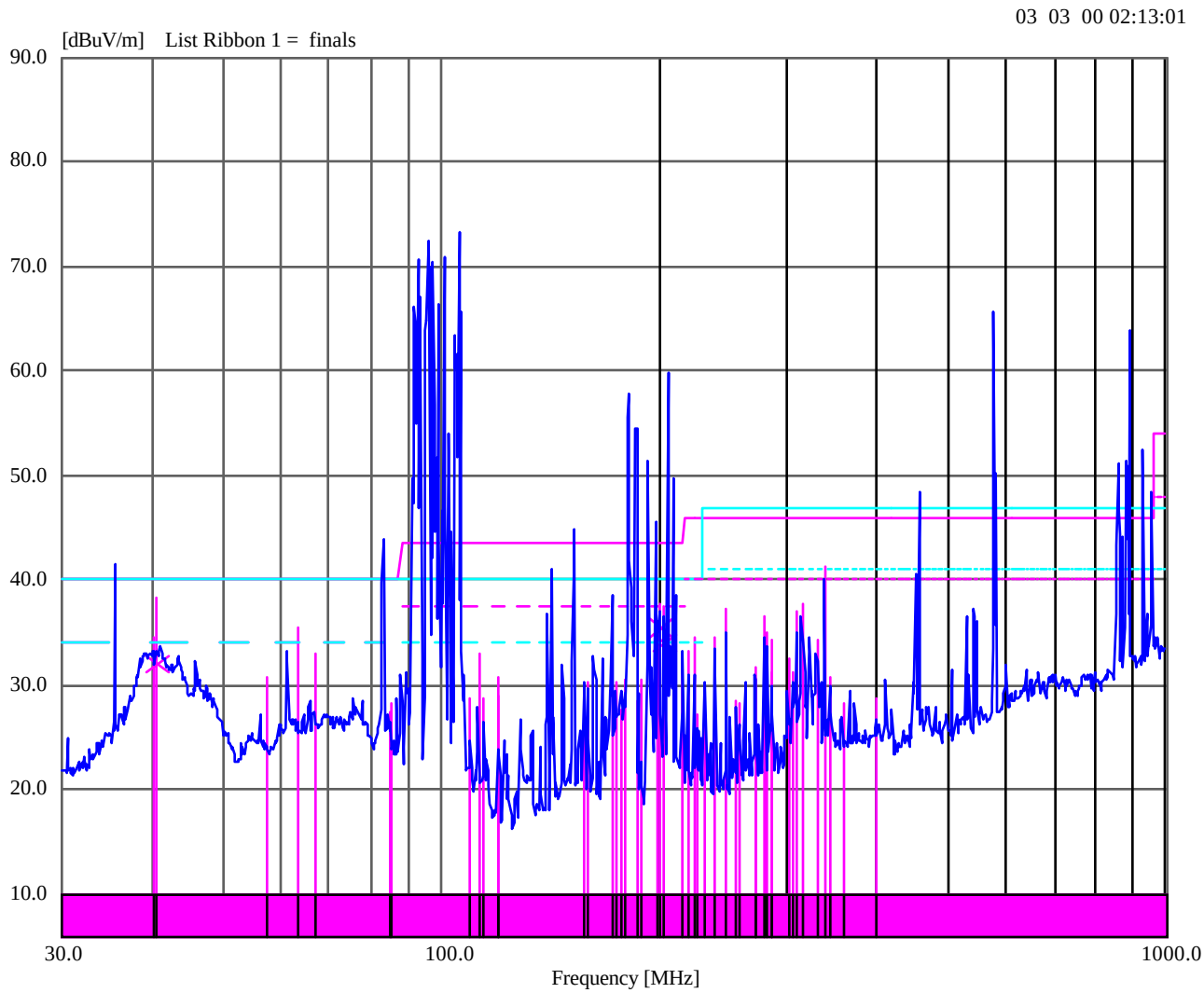
Frequency (MHz)	Pol	Hgt (cm)	Angle (deg)	Uncor-Pk (dBuV)	Tot Corr (dB)	Peak (dBuV/m)	DelLim-Pk (dB)	DelLim-QP (dB)
40.132493	Vert	100	95	24.70	9.76	34.46	-5.54	
40.561893	Vert	100	110	28.50	9.70	38.20	-1.80	-8.03
57.556145	Vert	100	135	21.60	9.01	30.61	-9.39	
63.315868	Vert	100	205	25.90	9.58	35.48	-4.52	
67.125519	Vert	100	190	22.90	10.00	32.90	-7.10	
84.662168	Vert	100	50	15.90	11.35	27.25	-12.75	
85.683247	Vert	100	105	16.70	11.38	28.08	-11.92	
109.491538	Vert	100	50	17.30	11.37	28.67	-11.33	
112.641913	Vert	100	40	21.60	11.28	32.88	-7.12	
114.559113	Vert	100	200	17.50	11.24	28.74	-11.26	
119.576514	Vert	100	205	19.50	11.11	30.61	-9.39	
120.032156	Vert	100	165	16.00	11.10	28.94	-11.06	
157.539885	Vert	100	285	16.00	12.59	28.94	-11.06	
159.418121	Vert	100	0	17.60	12.67	30.27	-9.73	
171.855567	Vert	100	175	16.00	12.94	28.94	-11.06	
174.230597	Vert	100	60	17.20	12.93	30.13	-9.87	
176.586784	Vert	100	55	14.80	12.92	27.72	-12.28	
179.021454	Vert	100	65	17.40	12.90	30.30	-9.70	
186.183054	Vert	100	75	15.40	12.87	28.27	-11.73	
188.562624	Vert	100	80	17.60	12.86	30.46	-9.54	
199.253457	Vert	100	60	20.10	13.18	33.28	-6.72	
200.488169	Vert	100	75	24.60	13.22	37.82	-2.18	-8.18
203.228965	Horz	160	20	24.10	13.37	37.47	-2.53	-5.97
215.170422	Horz	190	25	18.50	14.00	32.50	-7.50	
219.165074	Horz	190	20	18.90	14.21	33.11	-6.89	
223.164104	Horz	200	0	20.10	14.42	34.52	-5.48	
225.287219	Horz	200	240	12.70	14.52	27.22	-12.78	
231.107839	Horz	140	15	14.80	14.69	29.49	-17.51	
239.050448	Horz	140	5	19.50	14.91	34.41	-12.59	
247.083032	Horz	150	10	22.10	15.14	37.24	-9.76	
255.036883	Horz	160	15	13.10	15.41	28.51	-18.49	
257.761049	Horz	200	20	12.50	15.51	28.01	-18.99	
270.918458	Horz	210	35	14.40	15.99	30.39	-16.61	

272.057995	Horz	200	40	15.60	16.03	31.63	-15.37	
278.946486	Horz	160	55	20.10	16.33	36.43	-10.57	
281.593967	Horz	160	30	18.50	16.46	34.96	-12.04	
286.371281	Horz	160	30	14.50	16.69	31.19	-15.81	
286.905117	Horz	160	345	17.60	16.71	34.31	-12.69	
300.730652	Horz	200	5	15.10	17.38	32.48	-14.52	
305.479790	Horz	200	10	13.60	17.55	31.15	-15.85	
309.756339	Horz	200	20	19.20	17.71	36.91	-10.09	
315.028042	Horz	200	25	19.80	17.90	37.70	-9.30	
329.370302	Horz	200	15	15.90	18.35	34.25	-12.75	
337.914264	Horz	200	35	22.80	18.53	41.33	-5.67	
343.661396	Horz	200	35	12.10	18.64	30.74	-16.26	
358.679971	Horz	200	40	9.20	19.02	28.22	-18.78	
398.441827	Horz	200	80	8.70	19.87	28.57	-18.43	

Table 4 Product Emissions

Frequency (MHz)	Pol	Hgt (cm)	Angle (deg)	Uncor-Pk (dBuV)	Tot Corr (dB)	Peak (dBuV/m)	DelLim-Pk (dB)	DelLim-QP (dB)
40.561893	Vert	100	110	28.50	9.70	38.20	-1.80	-8.03
200.488169	Vert	100	75	24.60	13.22	37.82	-2.18	-8.18
203.228965	Horz	160	20	24.10	13.37	37.47	-2.53	-5.97
63.315868	Vert	100	205	25.90	9.58	35.48	-4.52	
223.164104	Horz	200	0	20.10	14.42	34.52	-5.48	
40.132493	Vert	100	95	24.70	9.76	34.46	-5.54	
337.914264	Horz	200	35	22.80	18.53	41.33	-5.67	
199.253457	Vert	100	60	20.10	13.18	33.28	-6.72	
219.165074	Horz	190	20	18.90	14.21	33.11	-6.89	
67.125519	Vert	100	190	22.90	10.00	32.90	-7.10	

Emissions Plots



Product Emissions