

Tactex Controls MTC Express

Report of Measurements

per

FCC CFR47 Part 15/B

Revision 1.0

May 27, 2000

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

EUT:

Touchpad Input Device

Manufacturer TACTEX
Part Number MTC Express
Serial Number ENG 02

Host:

Desktop Computer, w/ Windows 98, 2nd Ed.
Manufacturer: Compaq
Model Presario 7469
S/N 3D02DCQX4093

Monitor:

Manufacturer: Acer
Model 7034T
S/N M34T116266P1

Mouse:

Manufacturer: Logitech
Model M-548A

Keyboard:

Manufacturer: Compaq
Model SK-2800C

Cabling:

Cable	# of conductors	Shielded	Ferrite
Host Power Cable	3	No	No
EUT Power Cable	2	No	No
USB Cable	4	No	No
VGA Cable	3	Yes	Yes

Test Setup:

The EUT and Host were interconnected by the cabling supplied with each unit, and the drivers were installed to activate the touchpad. A demonstration program window was opened to show full functionality of the EUT.

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 Appareil numerique de la Classe B respecte toutes les exigences du Reglement sur le material brouilleur du Canada."

Information to the user:

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 provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed 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: March 16, 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: March 16, 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.

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

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)
.6087	40.1	-7.9
.6903	39.9	-8.1
.723	39.7	-8.3
.7508	39.6	-8.4
.6011	39.4	-8.6

Table 2: Line 2 Conducted

Frequency (MHz)	Peak (dBuV)	DelLim-Peak (dB)
.4873	35.6	-12.4
.8515	33.2	-14.8
.723	32.3	-15.7
.7445	31.8	-16.2
.7667	31.1	-16.9

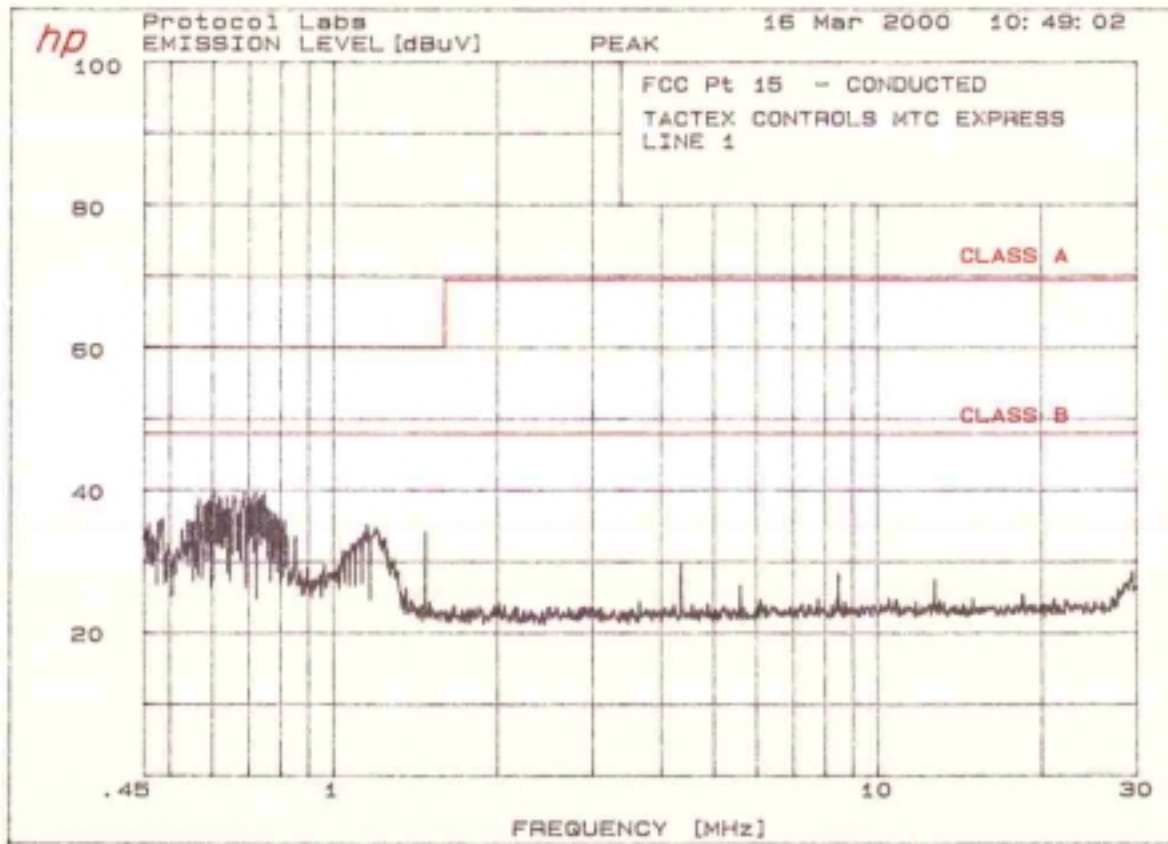
Table 3 All Suspects

Frequency (MHz)	Hgt (cm)	Angle (deg)	Polarity	Uncor-Pk (dBuV)	Tot Corr (dB)	Peak (dBuV/m)	DelLim-Pk (dB)	DelLim-QP (dB)
40.479486	100	55	Vert	26.10	9.72	35.82	-4.18	-7.70
43.044218	100	55	Vert	28.30	9.40	37.70	-2.30	-6.35
44.399872	100	70	Vert	29.80	9.21	39.01	-0.99	-3.84
47.799868	100	270	Vert	28.80	8.78	37.58	-2.42	-6.81
51.694338	100	100	Vert	21.70	8.62	30.32	-9.68	
52.134232	100	95	Vert	18.90	8.69	27.59	-12.41	
52.251653	100	60	Vert	22.40	8.65	31.05	-8.95	
53.269593	100	335	Vert	20.00	8.75	28.75	-11.25	
54.352862	100	300	Vert	20.30	8.81	29.11	-10.89	
54.472941	100	205	Vert	21.40	8.82	30.22	-9.78	
69.002939	100	140	Vert	23.00	10.24	33.24	-6.76	
76.103756	100	180	Vert	21.50	10.90	32.40	-7.60	
83.701797	100	80	Vert	22.10	11.33	33.43	-6.57	
108.621503	100	300	Vert	11.40	11.39	22.79	-20.71	
114.314366	100	210	Vert	13.30	11.24	24.54	-18.96	
122.960487	100	190	Vert	12.50	11.08	23.58	-19.92	
123.960486	100	190	Vert	14.90	11.08	25.98	-17.52	

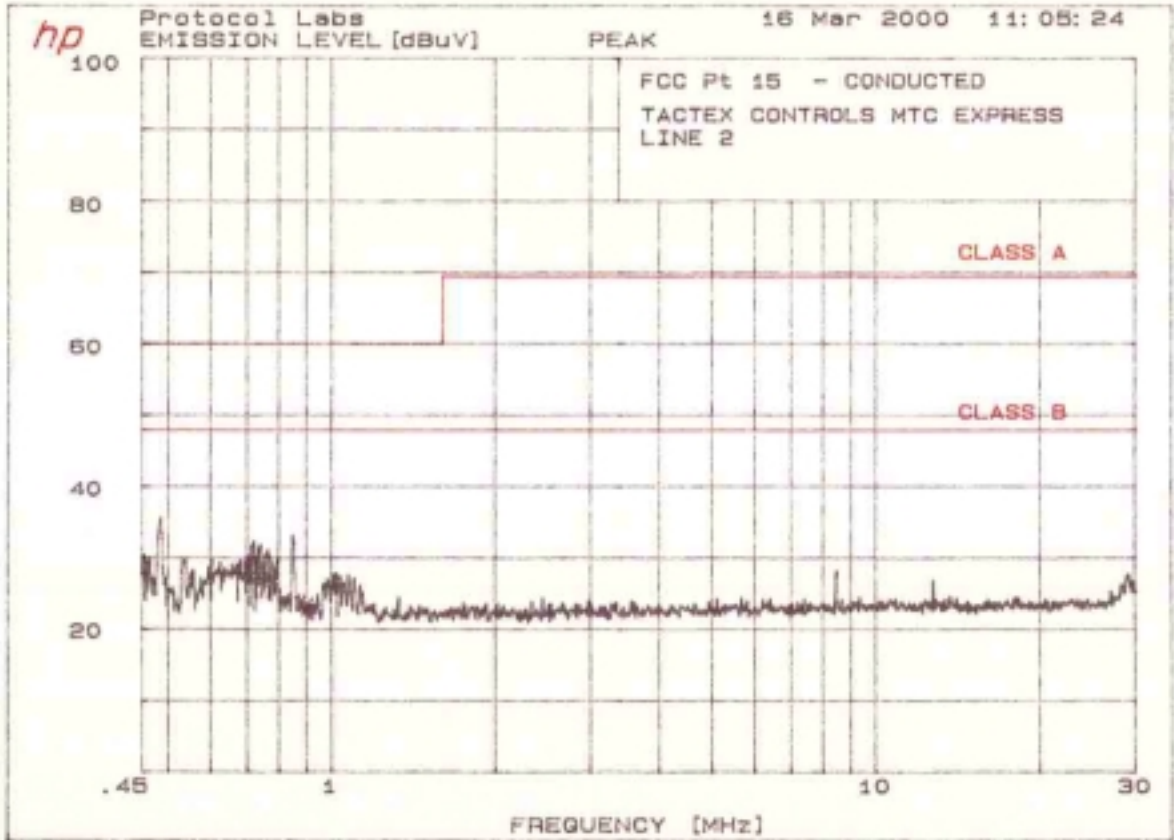
Table 4 Product Emissions

Frequency (MHz)	Hgt (cm)	Angle (deg)	Polarity	Uncor-Pk (dBuV)	Tot Corr (dB)	Peak (dBuV/m)	DelLim-Pk (dB)	DelLim-QP (dB)
44.399872	100	70	Vert	29.80	9.21	39.01	-0.99	-3.84
43.044218	100	55	Vert	28.30	9.40	37.70	-2.30	-6.35
47.799868	100	270	Vert	28.80	8.78	37.58	-2.42	-6.81
40.479486	100	55	Vert	26.10	9.72	35.82	-4.18	-7.70
83.701797	100	80	Vert	22.10	11.33	33.43	-6.57	
69.002939	100	140	Vert	23.00	10.24	33.24	-6.76	
76.103756	100	180	Vert	21.50	10.90	32.40	-7.60	
52.251653	100	60	Vert	22.40	8.65	31.05	-8.95	
51.694338	100	100	Vert	21.70	8.62	30.32	-9.68	
54.472941	100	205	Vert	21.40	8.82	30.22	-9.78	

Emissions Plots

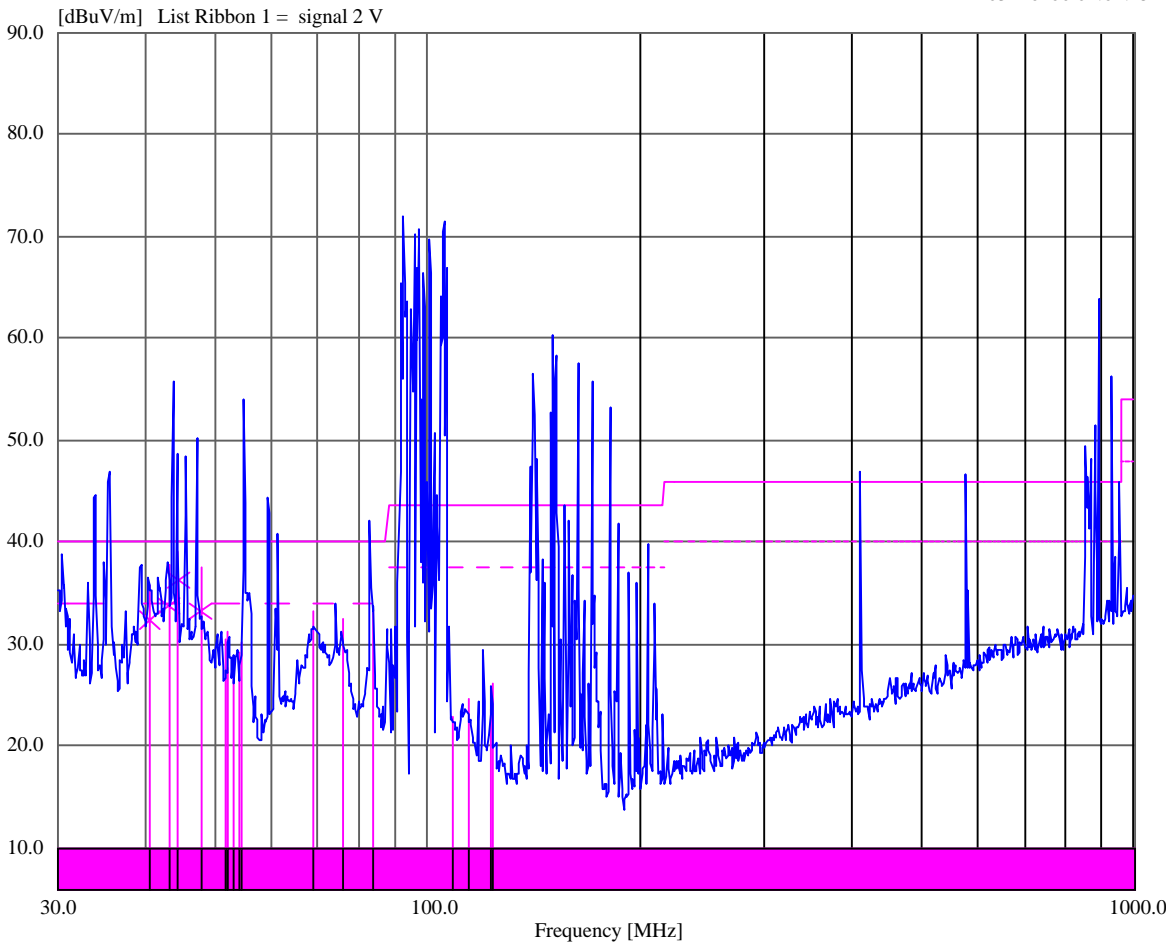


Conducted Emissions Line 1



Conducted Emissions Line 2

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Product Emissions