

Intermec Technologies Corporation

EMC Test Laboratory

DOC. NO.: 577-501-130

915 PC Card Radio Module, IP3, PCII, FCC 15.247, Canada RSS-210, RSS-102

APPENDIX E, Out of Band Radiated Emissions

REPORT NO: 030611-1

DATE: June 11, 2003

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FCC ID: EHARFID915PCC-6

MEASUREMENT/TECHNICAL REPORT



Technologies Corporation

EMC Test Laboratory

Cedar Rapids, IA

**Intermec Technologies Corporation
RF Identification (RFID) 915 PC Card –6
915 MHz Spread Spectrum Transmitter**

REPORT NO: 030611-1

DATE: June 11, 2003

Appendix E

RADIATED EMISSIONS DATA

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Emissions below 1 GHz

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Emissions above 1 GHz

Intermec Technologies Corporation Emission Test

EUT: IP3 RFID reader for 700

Manufacturer / Eng.: Intermec / T. Schuster

Operating Condition: TX 915 MHz Continuous Modulated

Test Site: EMC Lab, Cedar Rapids IA

Operator: df

Test Specification: FCC Class B

Comment: Max test of system

Start of Test: 9/25/03 / 10:05:55AM

SCAN TABLE: "3m ESI RE"

Short Description: 3m Field Strength

Start	Stop	Step	Detector	Meas. IF	Transducer
Frequency	Frequency	Width	Time	Bandw.	
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s 120 kHz	3M 3110B 1185
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s 120 kHz	3M 3146 3277

Radiated Emissions Test Data is Obtained Using Broadband Antennas.

MEASUREMENT RESULT: "Semi LBV_fin QP"

9/25/03 10:07AM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
168.000000	34.30	14.2	43.5	9.2	120	100.0	150.0	VER	-comment-

MEASUREMENT RESULT: "Semi HBV_fin QP"

9/29/03 7:28AM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
216.040000	43.70	13.1	48.0	4.3	120	99.0	0.0	VER	-comment-
456.000000	42.10	19.0	48.0	5.9	120	99.0	214.0	VER	-comment-
480.000000	36.20	19.8	48.0	11.8	120	99.0	1.0	VER	-comment-

MEASUREMENT RESULT: "Semi LBH_fin QP"

9/25/03 9:56AM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
168.000000	39.40	14.2	43.5	4.1	120	193.0	237.0	HOR	-comment-
197.360000	33.50	16.7	43.5	10.0	120	164.0	35.0	HOR	-comment-

MEASUREMENT RESULT: "Semi HBH_fin QP"

9/29/03 9:04AM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
*216.040000	47.90	13.1	48.0	0.1	120	102.0	28.0	HOR	-comment-
221.360000	37.60	12.9	48.0	10.4	120	99.0	45.0	HOR	-comment-
264.000000	36.80	14.6	48.0	11.2	120	99.0	41.0	HOR	-comment-

* Note- Emissions at 216.04 MHz are not within a forbidden band. Emissions limit show would be - 20 dBc of TX radiated power maximum. (126.5 - 20 = 106.5 dBμV/m@3m)

AVERAGE TRANSMITTER RADIATED SPURIOUS EMISSIONS

FCC ID: EHARFID915PCC-6

Intermec Technologies Corporation

Product: Intermec IP3 RFID Scanner for Intermec 700

EMC Test Laboratory

Set Up: Radio remote antenna from handle on PCMCIA/serial adapter

Cedar Rapids, IA

Test Date (mm/dd/yy): 09/22/03

Standard: FCC 15.247

Measurement System Calibration Date: 06/20/03

Span 100 MHz, Res. B.W. 1 MHz, Video B.W. 3 kHz

Quasi-peak measurement below 1 GHz, Average measurements above 1 GHz

Frequency (MHz)	Antenna Polarity	Spurious Measured dB(uV)	H.P.filter + Cable Loss (dB)	Antenna Correction Factor dB/M	Amplifier Gain (dB)	Calculated Result dB(uV)/M	AVERAGE Limit @ 3 Meter dB(uV)/Meter 50% duty cycle correction of 6dB	Margin (dB)
a	b	c	d	e	f	g	h	i
(formula)						(=c+d+e-f)		(=g-h)
Low Channel 07		902.625 MHz						
902.625	Vert		3.40	23.20				
(Fc)	Hor		3.40	23.20				
1805.25	Vert	40.96	4.54	27.76	33.50	39.8	60	-20.2
(Fc * 2)	Hor	48.11	4.54	27.76	33.50	46.9	60	-13.1
2707.875	Vert	51.44	4.25	29.52	33.58	51.6	60	-8.4
(Fc * 3)	Hor	49.47	4.25	29.52	33.58	49.7	60	-10.3
3610.5	Vert	35.93	4.18	31.58	33.40	38.3	60	-21.7
(Fc * 4)	Hor	38.13	4.18	31.58	33.40	40.5	60	-19.5
4513.125	Vert	45.29	5.16	32.95	33.08	50.3	60	-9.7
(Fc * 5)	Hor	48.87	5.16	32.95	33.08	53.9	60	-6.1
5415.75	Vert	34.07	5.59	34.49	32.44	41.7	60	-18.3
(Fc * 6)	Hor	34.00	5.59	34.49	32.44	41.6	60	-18.4
6318.375	Vert	47.19	6.45	34.88	31.80	56.7	60	-3.3
(Fc * 7)	Hor	47.15	6.45	34.88	31.80	56.7	60	-3.3
7221	Vert	39.12	6.50	36.50	32.30	49.8	60	-10.2
(Fc * 8)	Hor	40.38	6.50	36.50	32.30	51.1	60	-8.9
8123.625	Vert	37.88	7.00	38.36	33.06	50.2	60	-9.8
(Fc * 9)	Hor	37.50	7.00	38.36	33.06	49.8	60	-10.2
9026.25	Vert	32.39	6.86	38.54	33.22	44.6	60	-15.4
(Fc * 10)	Hor	33.19	6.86	38.54	33.22	45.4	60	-14.6

Middle Channel 40		915.000 MHz						
915	Vert		3.40	23.25				
(Fc)	Hor		3.40	23.25				
1830	Vert	46.08	4.57	27.92	33.50	45.1	60	-14.9
(Fc * 2)	Hor	48.78	4.57	27.92	33.50	47.8	60	-12.2
2745	Vert	52.36	4.32	29.65	33.60	52.7	60	-7.3
(Fc * 3)	Hor	49.59	4.32	29.65	33.60	50.0	60	-10.0
3660	Vert	38.04	4.21	31.72	33.38	40.6	60	-19.4
(Fc * 4)	Hor	37.31	4.21	31.72	33.38	39.9	60	-20.1
4575	Vert	44.04	4.91	33.18	33.04	49.1	60	-10.9
(Fc * 5)	Hor	48.33	4.91	33.18	33.04	53.4	60	-6.6
5490	Vert	34.04	5.36	34.50	32.40	41.5	60	-18.5
(Fc * 6)	Hor	34.31	5.36	34.50	32.40	41.8	60	-18.2
6405	Vert	45.08	6.14	34.92	31.72	54.4	60	-5.6
(Fc * 7)	Hor	44.44	6.14	34.92	31.72	53.8	60	-6.2
7320	Vert	34.51	6.23	36.46	32.60	44.6	60	-15.4
(Fc * 8)	Hor	33.24	6.23	36.46	32.60	43.3	60	-16.7
8235	Vert	37.05	6.58	38.20	33.09	48.7	60	-11.3
(Fc * 9)	Hor	36.48	6.58	38.20	33.09	48.2	60	-11.8
9150	Vert	35.87	7.06	38.42	33.26	48.1	60	-11.9
(Fc * 10)	Hor	35.84	7.06	38.42	33.26	48.1	60	-11.9

AVERAGE TRANSMITTER RADIATED SPURIOUS EMISSIONS

FCC ID: EHARFID915PCC-6

Intermec Technologies Corporation

Product: Intermec IP3 RFID Scanner for Intermec 700

EMC Test Laboratory

Set Up: Radio remote antenna from handle on PCMCIA/serial adapter

Cedar Rapids, IA

Test Date (mm/dd/yy): 09/22/03

Standard: FCC 15.247

Measurement System Calibration Date: 06/20/03

Span 100 MHz, Res. B.W. 1 MHz, Video B.W. 3 kHz

Quasi-peak measurement below 1 GHz, Average measurements above 1 GHz

Frequency (MHz)	Antenna Polarity	Spurious Measured dB(uV)	H.P.filter + Cable Loss (dB)	Antenna Correction Factor dB/M	Amplifier Gain (dB)	Calculated Result dB(uV)/M	AVERAGE Limit @ 3 Meter dB(uV)/Meter 50% duty cycle correction of 6dB	Margin (dB)
a	b	c	d	e	f	g	h	i
(formula)						(=c+d+e-f)		(=g-h)
High Channel 73	927.375	MHz						
927.375	Vert		3.40	23.20				
(Fc)	Hor		3.40	23.20				
1854.75	Vert	48.13	4.46	27.92	33.45	47.1	60	-12.9
(Fc * 2)	Hor	46.91	4.46	27.92	33.45	45.8	60	-14.2
2782.125	Vert	46.24	4.27	29.72	33.61	46.6	60	-13.4
(Fc * 3)	Hor	48.48	4.27	29.72	33.61	48.9	60	-11.1
3709.5	Vert	37.39	4.19	31.86	33.34	40.1	60	-19.9
(Fc * 4)	Hor	36.07	4.19	31.86	33.34	38.8	60	-21.2
4636.875	Vert	34.36	4.97	33.28	33.00	39.6	60	-20.4
(Fc * 5)	Hor	35.25	4.97	33.28	33.00	40.5	60	-19.5
5564.25	Vert	33.45	5.54	34.51	32.38	41.1	60	-18.9
(Fc * 6)	Hor	35.55	5.54	34.51	32.38	43.2	60	-16.8
6491.625	Vert	39.83	6.65	34.98	31.63	49.8	60	-10.2
(Fc * 7)	Hor	36.08	6.65	34.98	31.63	46.1	60	-13.9
7419	Vert	40.59	6.72	36.38	32.92	50.8	60	-9.2
(Fc * 8)	Hor	32.54	6.72	36.38	32.92	42.7	60	-17.3
8346.375	Vert	32.65	6.86	38.08	33.13	44.5	60	-15.5
(Fc * 9)	Hor	32.69	6.86	38.08	33.13	44.5	60	-15.5
9273.75	Vert	32.55	7.19	38.30	33.30	44.7	60	-15.3
(Fc * 10)	Hor	33.06	7.19	38.30	33.30	45.3	60	-14.8

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EMC Test Laboratory

Set Up: Radio remote antenna from handle on PCMCIA/serial adapter

Cedar Rapids, IA

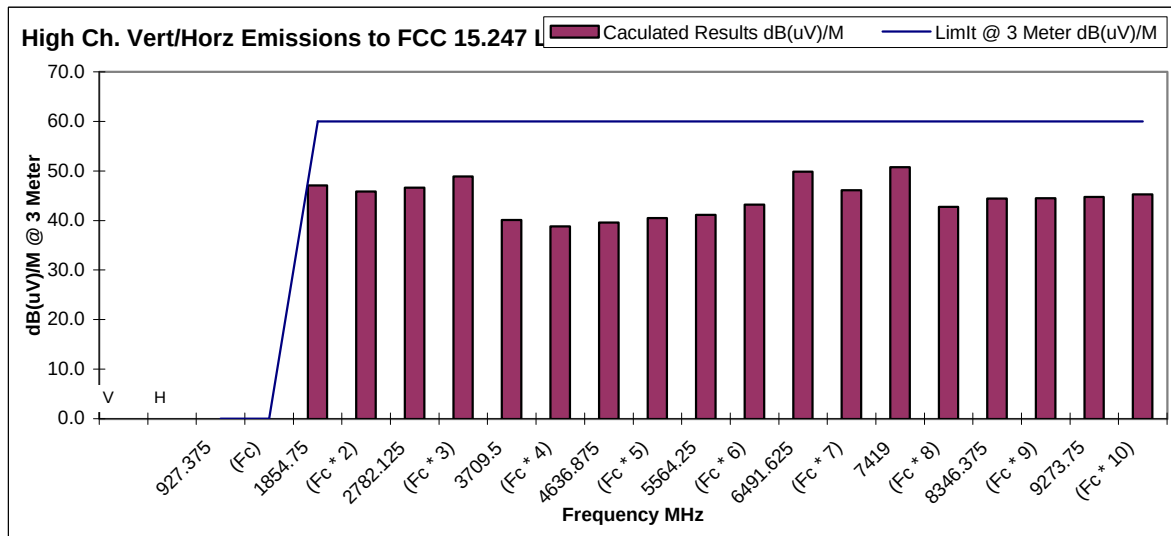
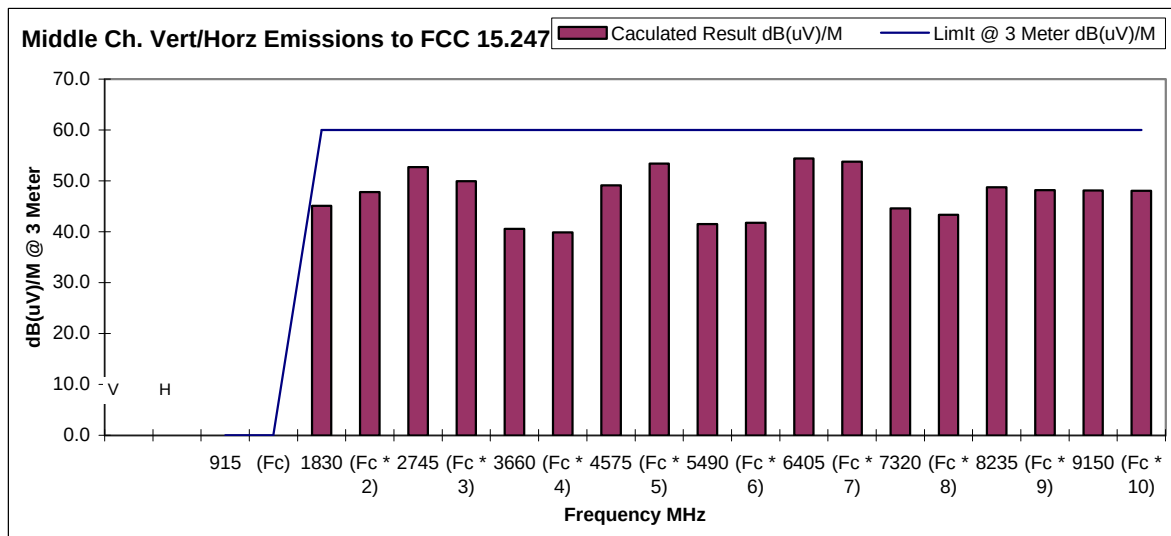
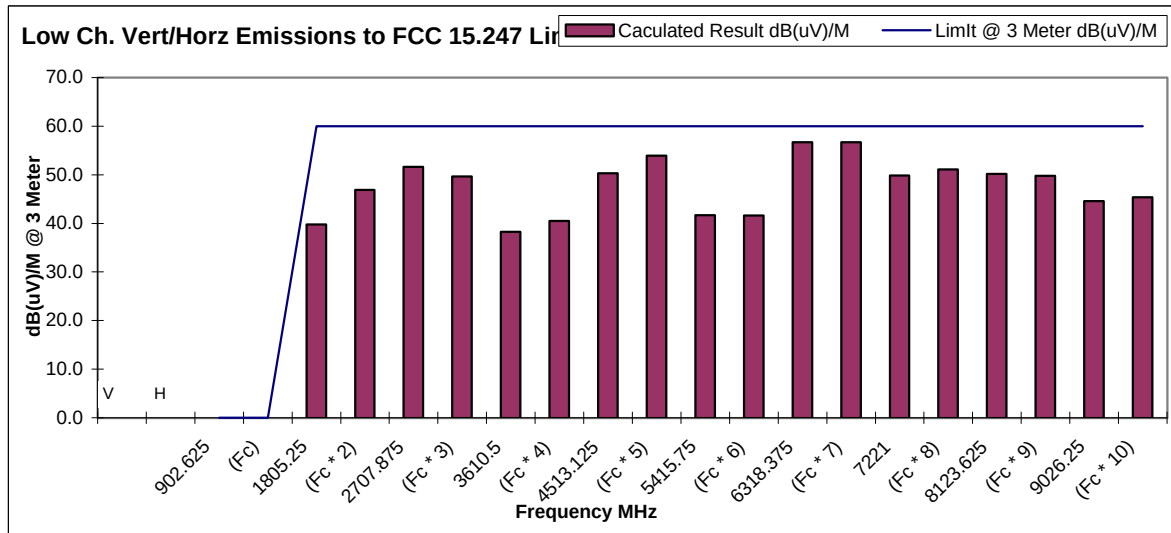
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Span 100 MHz, Res. B.W. 1 MHz, Video B.W. 3 kHz

Quasi-peak measurement below 1 GHz, Average measurements above 1 GHz



PEAK TRANSMITTER RADIATED SPURIOUS EMISSIONS

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Cedar Rapids, IA

Test Date (mm/dd/yy): 09/22/03

Standard: FCC 15.247

Measurement System Calibration Date: 06/20/03

Span 100 MHz, Res. B.W. 1 MHz, Video B.W. 1 MHz

Quasi-peak measurement below 1 GHz, Peak measurements above 1 GHz

Frequency (MHz)	Antenna Polarity	Spurious Measured dB(uV)	H.P.filter + Cable Loss (dB)	Antenna Correction Factor dB/M	Amplifier Gain (dB)	Calculated Result dB(uV)/M	QP and PEAK Limit @ 3 Meter dB(uV)/Meter	Margin (dB)
a	b	c	d	e	f	g	h	i
(formula)						(=c+d+e-f)		(=g-h)
Low Channel 07	902.625	MHz						
216	Vert	30.60	1.30	11.80		43.7	48	-4.3
(8 MHz*27)	Hor	34.80	1.30	11.80		47.9	48	-0.1
902.625	Vert	92.23	3.40	23.20				
(Fc)	Hor	96.76	3.40	23.20				
1805.25	Vert	46.97	4.54	27.76	33.50	45.8	74	-28.2
(Fc * 2)	Hor	51.18	4.54	27.76	33.50	50.0	74	-24.0
2707.875	Vert	52.42	4.25	29.52	33.58	52.6	74	-21.4
(Fc * 3)	Hor	52.37	4.25	29.52	33.58	52.6	74	-21.4
3610.5	Vert	44.46	4.18	31.58	33.40	46.8	74	-27.2
(Fc * 4)	Hor	45.75	4.18	31.58	33.40	48.1	74	-25.9
4513.125	Vert	48.79	5.16	32.95	33.08	53.8	74	-20.2
(Fc * 5)	Hor	50.98	5.16	32.95	33.08	56.0	74	-18.0
5415.75	Vert	43.94	5.59	34.49	32.44	51.6	74	-22.4
(Fc * 6)	Hor	44.72	5.59	34.49	32.44	52.4	74	-21.6
6318.375	Vert	49.89	6.45	34.88	31.80	59.4	74	-14.6
(Fc * 7)	Hor	50.80	6.45	34.88	31.80	60.3	74	-13.7
7221	Vert	45.54	6.50	36.50	32.30	56.2	74	-17.8
(Fc * 8)	Hor	45.11	6.50	36.50	32.30	55.8	74	-18.2
8123.625	Vert	45.86	7.00	38.36	33.06	58.2	74	-15.8
(Fc * 9)	Hor	44.52	7.00	38.36	33.06	56.8	74	-17.2
9026.25	Vert	43.92	6.86	38.54	33.22	56.1	74	-17.9
(Fc * 10)	Hor	43.85	6.86	38.54	33.22	56.0	74	-18.0

Middle Channel 40	915	MHz						
216	Vert	30.6	1.25	11.8		43.7	48	-4.3
(8 MHz*27)	Hor	34.8	1.25	11.8		47.9	48	-0.2
915	Vert	99.85	3.4	23.3				
(Fc)	Hor	99.56	3.4	23.3				
1830	Vert	50.00	4.57	27.92	33.50	49.0	74	-25.0
(Fc * 2)	Hor	52.00	4.57	27.92	33.50	51.0	74	-23.0
2745	Vert	54.09	4.32	29.65	33.60	54.5	74	-19.5
(Fc * 3)	Hor	52.10	4.32	29.65	33.60	52.5	74	-21.5
3660	Vert	45.54	4.21	31.72	33.38	48.1	74	-25.9
(Fc * 4)	Hor	45.26	4.21	31.72	33.38	47.8	74	-26.2
4575	Vert	47.85	4.91	33.18	33.04	52.9	74	-21.1
(Fc * 5)	Hor	50.65	4.91	33.18	33.04	55.7	74	-18.3
5490	Vert	44.78	5.36	34.50	32.40	52.2	74	-21.8
(Fc * 6)	Hor	44.91	5.36	34.50	32.40	52.4	74	-21.6
6405	Vert	48.77	6.14	34.92	31.72	58.1	74	-15.9
(Fc * 7)	Hor	48.10	6.14	34.92	31.72	57.4	74	-16.6
7320	Vert	43.92	6.23	36.46	32.60	54.0	74	-20.0
(Fc * 8)	Hor	43.69	6.23	36.46	32.60	53.8	74	-20.2
8235	Vert	44.42	6.58	38.20	33.09	56.1	74	-17.9
(Fc * 9)	Hor	44.68	6.58	38.20	33.09	56.4	74	-17.6
9150	Vert	44.31	7.06	38.42	33.26	56.5	74	-17.5
(Fc * 10)	Hor	44.59	7.06	38.42	33.26	56.8	74	-17.2

PEAK TRANSMITTER RADIATED SPURIOUS EMISSIONS

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a	b	c	d	e	f	g	h	i
(formula)						(=c+d+e-f)		(=g-h)
High Channel 73		927.375 MHz						
216	Vert	30.6	1.25	11.8		43.7	48	-4.3
(8 MHz*27)	Hor	34.8	1.25	11.8		47.9	48	-0.2
927.375	Vert	96.28	3.4	23.2				
(Fc)	Hor	97.57	3.40	23.20				
1854.75	Vert	51.81	4.46	27.92	33.45	50.7	74	-23.3
(Fc * 2)	Hor	50.62	4.46	27.92	33.45	49.6	74	-24.5
2782.125	Vert	49.76	4.27	29.72	33.61	50.1	74	-23.9
(Fc * 3)	Hor	51.05	4.27	29.72	33.61	51.4	74	-22.6
3709.5	Vert	45.41	4.19	31.86	33.34	48.1	74	-25.9
(Fc * 4)	Hor	44.82	4.19	31.86	33.34	47.5	74	-26.5
4636.875	Vert	45.07	4.97	33.28	33.00	50.3	74	-23.7
(Fc * 5)	Hor	44.42	4.97	33.28	33.00	49.7	74	-24.3
5564.25	Vert	44.98	5.54	34.51	32.38	52.7	74	-21.4
(Fc * 6)	Hor	45.06	5.54	34.51	32.38	52.7	74	-21.3
6491.625	Vert	46.26	6.65	34.98	31.63	56.3	74	-17.7
(Fc * 7)	Hor	44.65	6.65	34.98	31.63	54.7	74	-19.4
7419	Vert	46.05	6.72	36.38	32.92	56.2	74	-17.8
(Fc * 8)	Hor	43.89	6.72	36.38	32.92	54.1	74	-19.9
8346.4	Vert	43.89	6.86	38.08	33.13	55.7	74	-18.3
(Fc * 9)	Hor	44.16	6.86	38.08	33.13	56.0	74	-18.0
9273.8	Vert	43.57	7.19	38.30	33.30	55.8	74	-18.2
(Fc * 10)	Hor	43.29	7.19	38.30	33.30	55.5	74	-18.5

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