

MEASUREMENT/TECHNICAL REPORT



**Intermec Technologies Corporation
IV6 Transmitter Co-Location of
FCC ID: EHARFID915PCC-6 (IC: 1223A-RFIDPCC6)
And
FCC ID: HN2-C30XX (IC: 1223A-C30XX)**

REPORT NO: 041116-2

**DATE: November 16, 2004
Appendix F**

TX RADIATED EMISSIONS DATA

Quasi-peak, average and peak radiated spurious emissions.

Configurations

Pages 2-5 Measurement Antenna Vertical

Pages 6-9 Measurement Antenna Horizontal

Page 10 Collocation Spurious Calculator

Page 11 EIRP Data for 915 MHz RFID Transmitter

Quasi-Peak emission scans below 1 GHz to Class A limit
IV6 is a “commercial, industrial” product only
(no transmitter emissions found)

Peak (100% Duty Cycle Data)

Average (100 % Duty Cycle Data), data shows over the
limit, review the main test report for duty cycle reduction of
emissions per FCC 15.35(c) and RSS-210 (6.5)

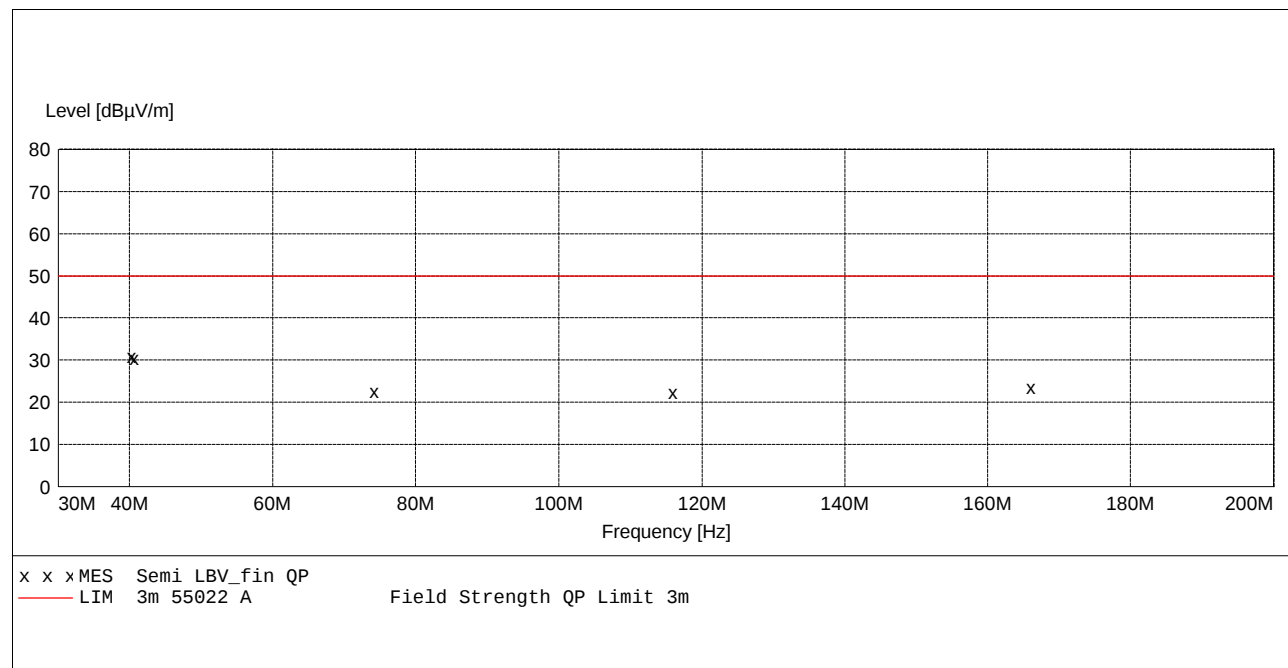
Intermec Technologies Corporation

Emission Test

EUT: IV6 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR 22 Class A
Comment: MAX, Test
Start of Test: 12/20/04 / 10:39:20AM

SCAN TABLE: "3m ESI RE"

Short Description:	3m Field Strength	IF	Transducer
Start Stop Step	Detector Meas. Time	Bandw.	
Frequency Frequency Width			
30.0 MHz 200.0 MHz 80.0 kHz	QuasiPeak 1.0 s	120 kHz	3M 3110B 1787
200.0 MHz 1.0 GHz 80.0 kHz	QuasiPeak 1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi LBV_fin QP"

12/20/04 10:52AM	Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
	MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
	40.160000	30.90	12.3	50.0	19.1	120	101.0	294.0	VER	-comment-
	40.560000	30.60	12.1	50.0	19.4	120	101.0	294.0	VER	-comment-
	74.160000	22.60	9.9	50.0	27.4	120	101.0	157.0	VER	-comment-
	115.920000	22.50	12.3	50.0	27.5	120	101.0	112.0	VER	-comment-
	165.920000	23.60	14.0	50.0	26.4	120	101.0	172.0	VER	-comment-

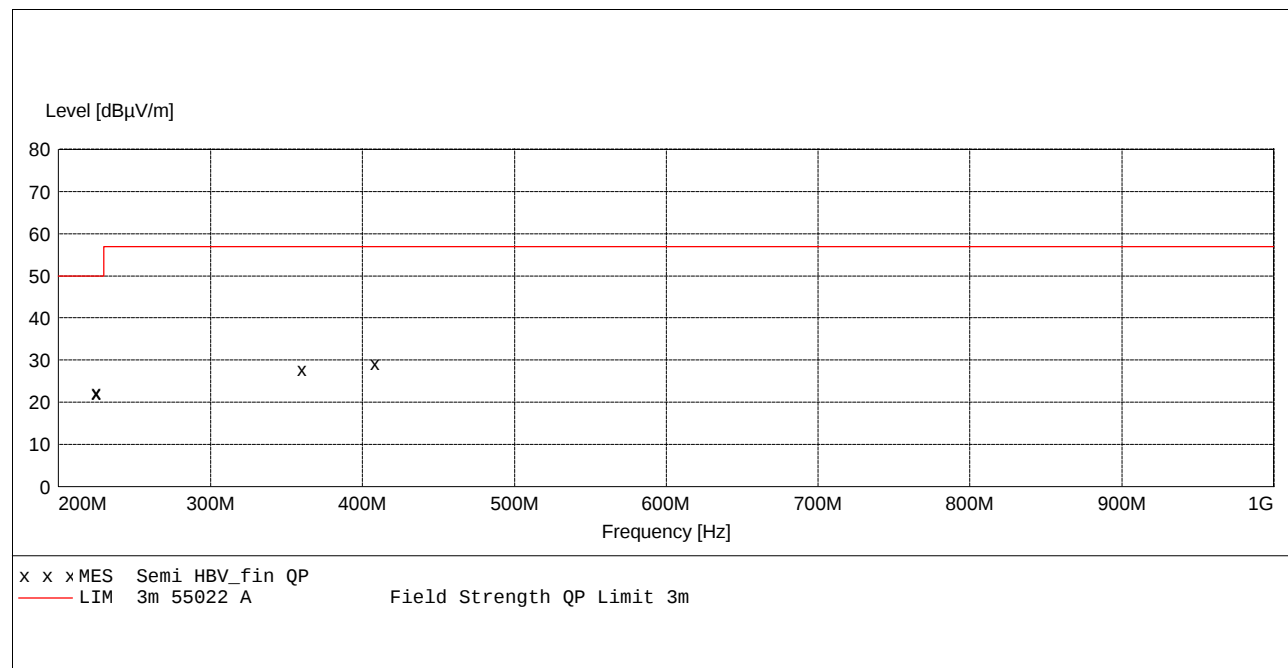
Intermec Technologies Corporation

Emission Test

EUT: IV6 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR22 Class A
Comment: MAX test
Start of Test: 12/20/04 / 1:10:26PM

SCAN TABLE: "3m ESI RE"

Short Description:		3m Field Strength		IF	Transducer
Start	Stop	Step	Detector	Meas. Time	
Frequency	Frequency	Width			Bandw.
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz 3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz 3M 3146 1262



MEASUREMENT RESULT: "Semi HBV_fin QP"

12/20/04 1:19PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
224.720000	22.50	12.6	50.0	27.5	120	101.0	194.0	VER	-comment-
225.040000	22.20	12.6	50.0	27.8	120	101.0	194.0	VER	-comment-
360.000000	28.00	16.9	57.0	29.0	120	101.0	193.0	VER	-comment-
408.000000	29.30	17.7	57.0	27.7	120	101.0	160.0	VER	-comment-

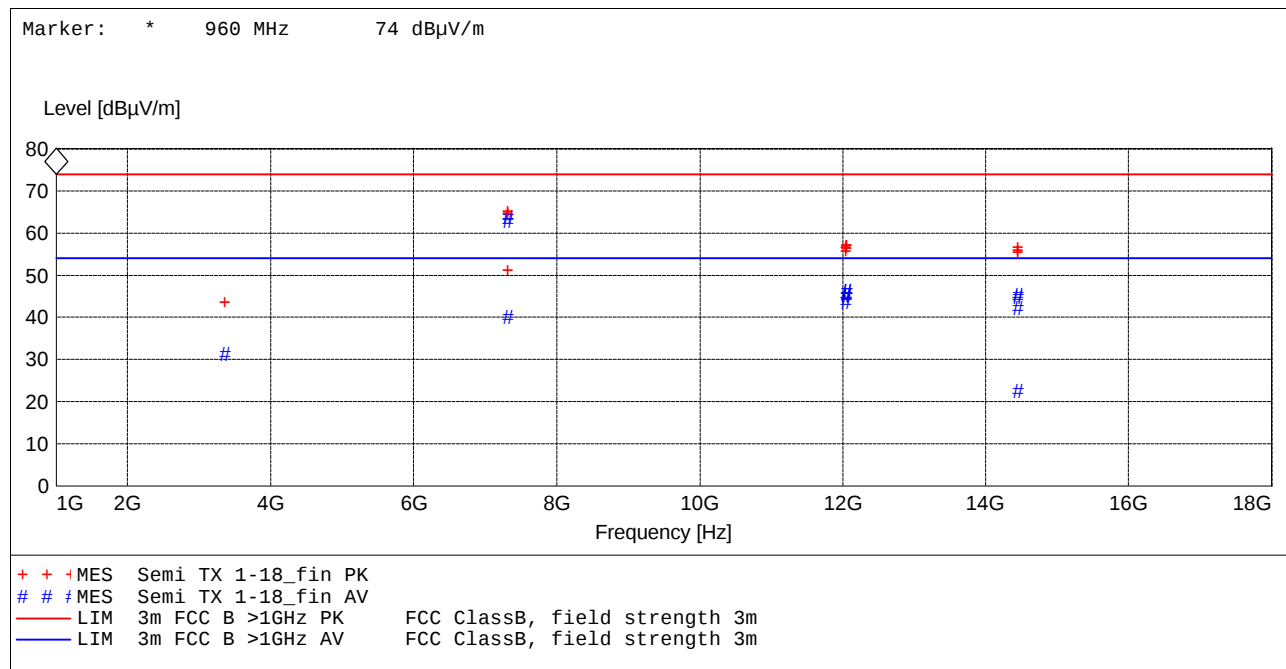
Intermec Technologies Corporation

Emission Test

EUT: IV6 Co-located RFID and BT radio
 Manufacturer / Eng.: Intermec / J JOHNSON
 Operating Condition: emission test program
 Test Site: EMC Lab, Cedar Rapids IA
 Operator: DF
 Test Specification: FCC Class B
 Comment: Max test of system
 Start of Test: 12/16/04 / 9:36:17AM

SCAN TABLE: "3m ESI RE TX 1-18"

Short Description:	3m Field Strength	Detector	Meas. Time	IF Bandw.	Transducer
Start Frequency 1.0 GHz	Stop Frequency 12.5 GHz	Step Width 600.0 kHz	MaxPeak	1.0 ms	1 MHz
12.5 GHz	18.0 GHz	600.0 kHz	Average	1.0 ms	1 MHz
			MaxPeak		
			Average		



MEASUREMENT RESULT: "Semi TX 1-18_fin PK"

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
3356.000000	43.80	0.6	74.0	30.2	1000	171.0	172.0	VER	Both TX ON
7320.000000	65.20	8.9	74.0	8.8	1000	189.0	213.0	VER	BT only
7320.000000	64.90	8.9	74.0	9.1	1000	199.0	214.0	VER	Both TX ON
7320.000000	51.30	8.9	74.0	22.7	1000	167.0	208.0	VER	RFID only
12050.000000	56.70	13.3	74.0	17.3	1000	180.0	162.0	VER	BT only
12050.100000	55.80	13.3	74.0	18.2	1000	277.0	301.0	VER	Both TX ON

MEASUREMENT RESULT: "Semi TX 1-18_fin PK"

(continued)

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
12051.000000	57.30	13.3	74.0	16.7	1000	183.0	358.0	VER	RFID only
12055.000000	57.20	13.3	74.0	16.8	1000	182.0	162.0	VER	BT only
12055.000000	56.50	13.3	74.0	17.5	1000	174.0	159.0	VER	Both TX ON
12055.600000	56.50	13.3	74.0	17.5	1000	182.0	358.0	VER	RFID only
14448.200000	56.70	13.4	74.0	17.3	1000	122.0	224.0	VER	BT only
14448.200000	56.10	13.4	74.0	17.9	1000	115.0	224.0	VER	Both TX ON
14448.200000	55.40	13.4	74.0	18.6	1000	139.0	291.0	VER	RFID only

MEASUREMENT RESULT: "Semi TX 1-18_fin AV"

12/16/04 11:23AM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
3356.000000	31.40	0.6	54.0	22.6	1000	171.0	172.0	VER	Both TX ON
7320.000000	63.70	8.9	54.0	-9.7	1000	189.0	213.0	VER	BT only
7320.000000	62.90	8.9	54.0	-8.9	1000	199.0	214.0	VER	Both TX ON
7320.000000	40.10	8.9	54.0	13.9	1000	167.0	208.0	VER	RFID only
12050.000000	45.30	13.3	54.0	8.7	1000	180.0	162.0	VER	BT only
12050.100000	43.60	13.3	54.0	10.4	1000	277.0	301.0	VER	Both TX ON
12051.000000	46.40	13.3	54.0	7.6	1000	183.0	358.0	VER	RFID only
12055.000000	46.30	13.3	54.0	7.7	1000	174.0	159.0	VER	Both TX ON
12055.000000	45.10	13.3	54.0	8.9	1000	182.0	162.0	VER	BT only
12055.600000	45.20	13.3	54.0	8.8	1000	182.0	358.0	VER	RFID only
14448.200000	45.20	13.4	54.0	8.8	1000	115.0	224.0	VER	Both TX ON
14448.200000	44.80	13.4	54.0	9.2	1000	122.0	224.0	VER	BT only
14448.200000	42.30	13.4	54.0	11.7	1000	139.0	291.0	VER	RFID only
14448.200000	22.70	13.4	54.0	31.3	1000	139.0	291.0	VER	RFID only

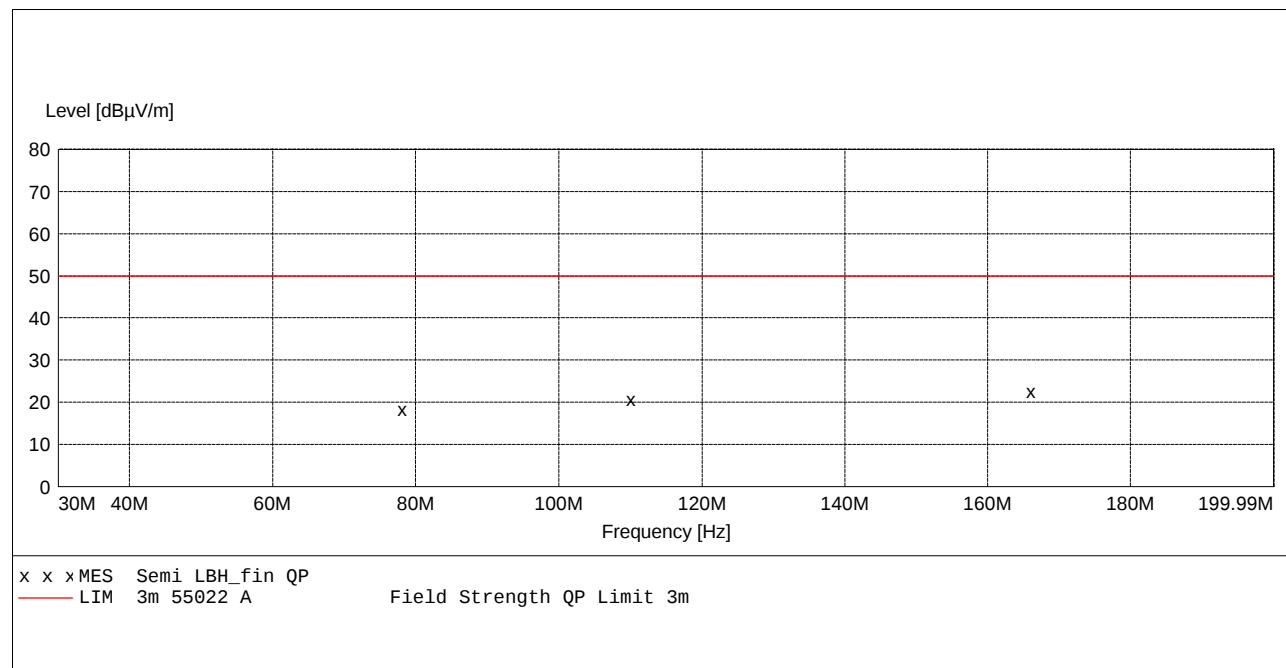
Intermec Technologies Corporation

Emission Test

EUT: IV6 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR 22 Class A
Comment: MAX, Test
Start of Test: 12/20/04 / 11:24:41AM

SCAN TABLE: "3m ESI RE"

Short Description:			3m Field Strength		IF	Transducer
Start	Stop	Step	Detector	Meas. Time	Bandw.	
Frequency	Frequency	Width				
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz	3M 3146 1262



MEASUREMENT RESULT: "Semi LBH_fin QP"

12/20/04 11:31AM	Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
	MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
	78.000000	18.50	10.0	50.0	31.5	120	137.0	257.0	HOR	-comment-
	110.000000	20.80	11.8	50.0	29.2	120	137.0	257.0	HOR	-comment-
	165.920000	22.70	14.0	50.0	27.3	120	128.0	183.0	HOR	-comment-

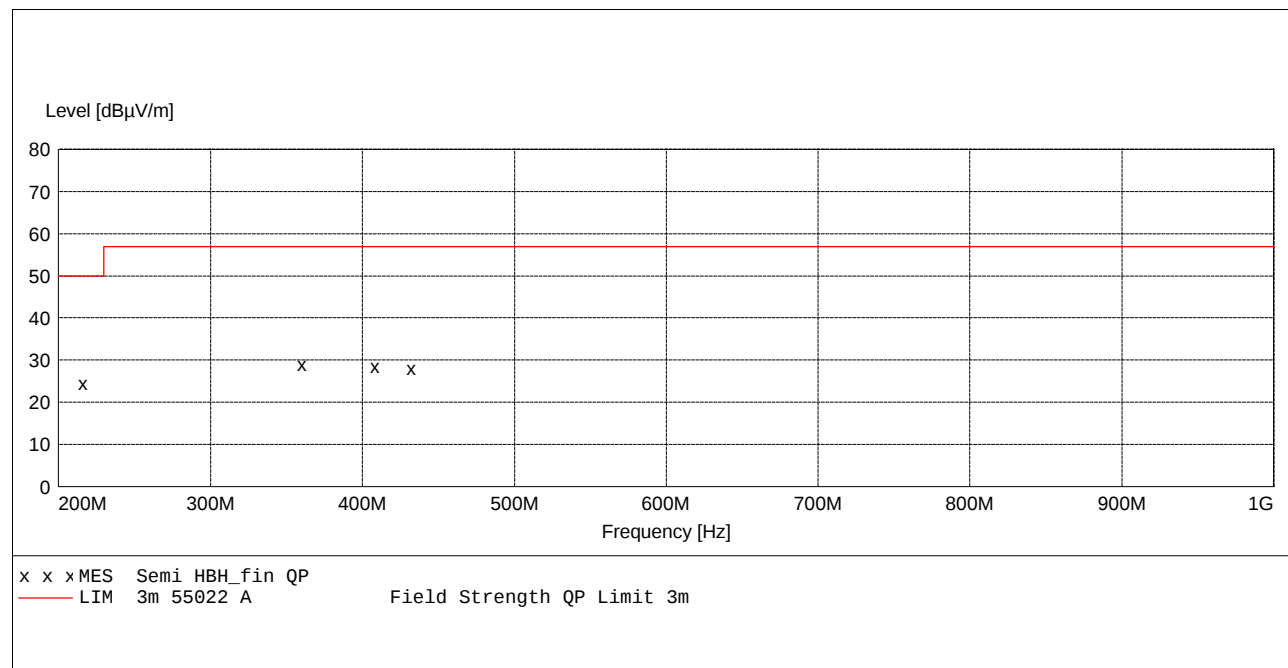
Intermec Technologies Corporation

Emission Test

EUT: IV6 RFID Reader
Manufacturer / Eng.: Intermec / K Braginton
Operating Condition: emission test program
Test Site: EMC Lab, Cedar Rapids IA
Operator: cb
Test Specification: EN55022/CISPR22 Class A
Comment: MAX test
Start of Test: 12/20/04 / 1:44:28PM

SCAN TABLE: "3m ESI RE"

Short Description:		3m Field Strength		IF	Transducer
Start	Stop	Step	Detector	Meas. Time	
Frequency	Frequency	Width			Bandw.
30.0 MHz	200.0 MHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz 3M 3110B 1787
200.0 MHz	1.0 GHz	80.0 kHz	QuasiPeak	1.0 s	120 kHz 3M 3146 1262



MEASUREMENT RESULT: "Semi HBH_fin QP"

12/20/04 1:52PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
216.000000	24.70	12.9	50.0	25.3	120	101.0	199.0	HOR	-comment-
360.000000	29.20	16.9	57.0	27.8	120	160.0	166.0	HOR	-comment-
408.000000	28.80	17.7	57.0	28.2	120	125.0	154.0	HOR	-comment-
432.000000	28.20	18.1	57.0	28.8	120	125.0	154.0	HOR	-comment-

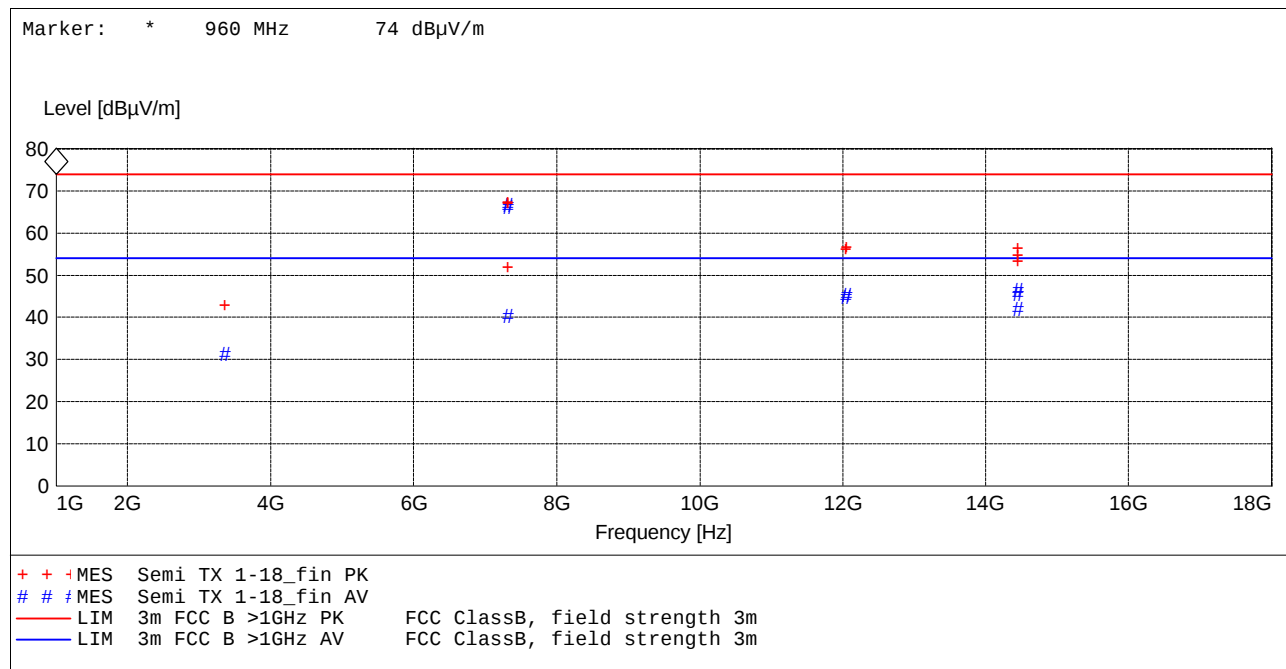
Intermec Technologies Corporation

Emission Test

EUT: IV6 Co-located RFID and BT radio
 Manufacturer / Eng.: Intermec / J JOHNSON
 Operating Condition: emission test program
 Test Site: EMC Lab, Cedar Rapids IA
 Operator: DF
 Test Specification: FCC Class B
 Comment: Max test of system
 Start of Test: 12/16/04 / 2:13:16PM

SCAN TABLE: "3m ESI RE TX 1-18"

Short Description:	3m Field Strength	Detector	Meas. Time	IF Bandw.	Transducer
Start Frequency 1.0 GHz	Stop Frequency 12.5 GHz	Step Width 600.0 kHz	MaxPeak	1.0 ms	1 MHz
12.5 GHz	18.0 GHz	600.0 kHz	Average	1.0 ms	1 MHz
			MaxPeak		
			Average		



MEASUREMENT RESULT: "Semi TX 1-18_fin PK"

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBμV/m	dB	dBμV/m	dB	kHz	cm	deg		
3356.000000	43.10	0.6	74.0	30.9	1000	148.0	189.0	HOR	Both TX ON
7320.000000	67.40	8.9	74.0	6.6	1000	112.0	222.0	HOR	BT only
7320.000000	67.30	8.9	74.0	6.7	1000	113.0	223.0	HOR	Both TX ON
7320.000000	52.10	8.9	74.0	21.9	1000	110.0	143.0	HOR	RFID only
12050.000000	56.30	13.3	74.0	17.7	1000	145.0	147.0	HOR	Both TX ON
12055.000000	56.90	13.3	74.0	17.1	1000	148.0	195.0	HOR	Both TX ON

MEASUREMENT RESULT: "Semi TX 1-18_fin PK"

(continued)

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
14448.200000	56.50	13.4	74.0	17.5	1000	130.0	137.0	HOR	BT only
14448.200000	54.80	13.4	74.0	19.2	1000	135.0	138.0	HOR	Both TX ON
14448.200000	53.50	13.4	74.0	20.5	1000	163.0	164.0	HOR	RFID only

MEASUREMENT RESULT: "Semi TX 1-18_fin AV"

12/16/04 3:50PM

Frequency	Level	Transd	Limit	Margin	IFBW	Height	Azimu.	Pol.	Comment
MHz	dBµV/m	dB	dBµV/m	dB	kHz	cm	deg		
3356.000000	31.30	0.6	54.0	22.7	1000	148.0	189.0	HOR	Both TX ON
7320.000000	66.60	8.9	54.0	-12.6	1000	112.0	222.0	HOR	BT only
7320.000000	66.20	8.9	54.0	-12.2	1000	113.0	223.0	HOR	Both TX ON
7320.000000	40.30	8.9	54.0	13.7	1000	110.0	143.0	HOR	RFID only
12050.000000	44.90	13.3	54.0	9.1	1000	145.0	147.0	HOR	Both TX ON
12055.000000	45.40	13.3	54.0	8.6	1000	148.0	195.0	HOR	Both TX ON
14448.200000	46.50	13.4	54.0	7.5	1000	130.0	137.0	HOR	BT only
14448.200000	45.70	13.4	54.0	8.3	1000	135.0	138.0	HOR	Both TX ON
14448.200000	41.90	13.4	54.0	12.1	1000	163.0	164.0	HOR	RFID only

Configuration	IV6 RFID FHSS 902.625 to 927.375 and Bluetooth FHSS 2402 to 2480 MHz
Comments	Low, Mid and High Channels adjusted to find any coinciding spurious emissions.
Any within 1 MHz is listed below.	

CH	7	CH	40	CH	73	CH	1	CH	40	CH	79
TX	902.625	TX	915	TX	927.375	TX	2402	TX	2441	TX	2480
	MHz		MHz		MHz		MHz		MHz		MHz
2	1805.250	2	1830.000	2	1854.750	2	4804.000	2	4882.000	2	4960.000
3	2707.875	3	2745.000	3	2782.125	3	7206.000	3	7323.000	3	7440.000
4	3610.500	4	3660.000	4	3709.500	4	9608.000	4	9764.000	4	9920.000
5	4513.125	5	4575.000	5	4636.875	5	12010.000	5	12205.000	5	12400.000
6	5415.750	6	5490.000	6	5564.250	6	14412.000	6	14646.000	6	14880.000
7	6318.375	7	6405.000	7	6491.625	7	16814.000	7	17087.000	7	17360.000
8	7221.000	8	7320.000	8	7419.000	8	19216.000	8	19528.000	8	19840.000
9	8123.625	9	8235.000	9	8346.375	9	21618.000	9	21969.000	9	22320.000
10	9026.250	10	9150.000	10	9273.750	10	24020.000	10	24410.000	10	24800.000
11	9928.875	11	10065.000	11	10201.125	11	26422.000	11	26851.000	11	27280.000
12	10831.500	12	10980.000	12	11128.500	12	28824.000	12	29292.000	12	29760.000
13	11734.125	13	11895.000	13	12055.875	13	31226.000	13	31733.000	13	32240.000
14	12636.750	14	12810.000	14	12983.250	14	33628.000	14	34174.000	14	34720.000
15	13539.375	15	13725.000	15	13910.625	15	36030.000	15	36615.000	15	37200.000
16	14442.000	16	14640.000	16	14838.000	16	38432.000	16	39056.000	16	39680.000
17	15344.625	17	15555.000	17	15765.375	17	40834.000	17	41497.000	17	42160.000
18	16247.250	18	16470.000	18	16692.750	18	43236.000	18	43938.000	18	44640.000
19	17149.875	19	17385.000	19	17620.125	19	45638.000	19	46379.000	19	47120.000
20	18052.500	20	18300.000	20	18547.500	20	48040.000	20	48820.000	20	49600.000
21	18955.125	21	19215.000	21	19474.875	21	50442.000	21	51261.000	21	52080.000
22	19857.750	22	20130.000	22	20402.250	22	52844.000	22	53702.000	22	54560.000
23	20760.375	23	21045.000	23	21329.625	23	55246.000	23	56143.000	23	57040.000
24	21663.000	24	21960.000	24	22257.000	24	57648.000	24	58584.000	24	59520.000
25	22565.625	25	22875.000	25	23184.375	25	60050.000	25	61025.000	25	62000.000
26	23468.250	26	23790.000	26	24111.750	26	62452.000	26	63466.000	26	64480.000
27	24370.875	27	24705.000	27	25039.125	27	64854.000	27	65907.000	27	66960.000
28	25273.500	28	25620.000	28	25966.500	28	67256.000	28	68348.000	28	69440.000
29	26176.125	29	26535.000	29	26893.875	29	69658.000	29	70789.000	29	71920.000
30	27078.750	30	27450.000	30	27821.250	30	72060.000	30	73230.000	30	74400.000
31	27981.375	31	28365.000	31	28748.625	31	74462.000	31	75671.000	31	76880.000

R=Restricted, NR=Non-Restricted emission listed in FCC Rules 47CFR15.205

	RFID MHz	Ch	MHz	Harmonic	BT MHz	Ch	MHz	Harmonic
NR	902.625	7	7221	8	2407	6	7221	3
R	915.375	41	7320	8	2440	39	7320	3
R	927	72	12051	13	2410	9	12050	5
R	927.375	73	12055.875	13	2411	10	12055	5
R	903	8	14448	16	2408	7	14448	6
NR	915	40	14640	16	2440	39	14640	6
NR	927.375	73	14838	14	2473	72	14838	6

TRANSMITTER EFFECTIVE ISOTROPIC RADIATED POWER (EIRP)

Product: Intermec IF6, IV6 (Connecticut)

Intermec Technologies Corporation

Set Up: Radio within Kathrien antenna housing.

EMC Test Laboratory

Test Date (mm/dd/yy): 12/01/04

Cedar Rapids, IA

Measurement System Calibration Date: 4/17/04

Standard: FCC 15.247

Peak Power Measured In 1 MHz BW with ESI Receiver

Frequency (MHz)	Antenna Polarity	Spurious Measure d dB(uV)	Spur Meas. (dBm)	Generator 0 dBm Ref. Level	Calculated Generator Substitution (dBm)	Antenna Comp (dB)	Cable Comp (dB)	Generator Reference at Antenna (dBm)	Spec Limit (dBm)	Margin (dB)
a	b	c	d	e	f	g	h	i	j	k
(formula)			(=c-107)		(=d-e)			(=f-g+h)		(=i-j)
Low Channel 07										
902.625	Vert	103.83	-3.17	-35.35	32.18	1.90	1.90	32.18	36.00	-3.82
(Fc)	Hor	103.25	-3.75	-33.79	30.04	1.90	1.90	30.04	36.00	-5.96
Middle Channel 40										
915.00	Vert	104.25	-2.75	-35.56	32.81	1.81	1.92	32.92	36.00	-3.08
(Fc)	Hor	105.11	-1.89	-34.15	32.26	1.81	1.92	32.37	36.00	-3.63
High Channel 73										
927.375	Vert	105.10	-1.90	-35.78	33.88	1.72	1.93	34.09	36.00	-1.91
(Fc)	Hor	106.60	-0.40	-34.52	34.12	1.72	1.93	34.33	36.00	-1.67