

5-Jun-03

Pout meas

Invensys Thermostat
Class 2 Permissive Change

f(MHz)	X position H	X position v	Y position H	Y position V	AF	CL	X H	X V	Y H	Y v
904	87.5	78.4	80.2	85	20.58		3.47	111.55	102.45	104.25
915	84.92	74.1	81.97	84.69	20.58		3.47	108.97	98.15	106.02
924.6	85.65	76.71	77.73	83.38	20.58		3.47	109.7	100.76	101.78

109.05
108.74
107.43

Test Engr: William Zhuang
Project #: 03U2028
Company: Invensys
EUT Descrip.: Thermostat Board
EUT M/N: EMST-100
Test Target: FCC 15.247
Mode Oper: Normal and Transmit

Test Equipment:

EMCO Horn 1-18GHz		Pre-amplifier 1-26GHz		Spectrum Analyzer		Horn > 18GHz	
T60; S/N: 2238 @1m							
Hi Frequency Cables							
e (2 ft)		e (2 ~ 3 ft)		e (4 ~ 6 ft)		b (12 ft)	
Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth				Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth			

[illegible]

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

06/14/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

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T60; S/N: 2238 @ 1m	T86 Miteq 924341	HP 8593EM Analyzer	
Hi Frequency Cables			
e (2 ft) e (2 ~ 3 ft) b (4 ~ 6 ft) b (12 ft)			
Peak Measurements: Average Measurements: 1 MHz Resolution Bandwidth 1 MHz Resolution Bandwidth 1MHz Video Bandwidth 10Hz Video Bandwidth			

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.715	9.9	51.6	45.9	30.7	3.8	-44.0	0.1	1.0	43.2	37.5	74.0	54.0	-30.8	-16.5	905MHz, 3rd. Y, V
2.715	9.9	51.1	43.1	30.7	3.8	-44.0	0.1	1.0	42.7	34.7	74.0	54.0	-31.3	-19.3	905MHz, 3rd. Y, H
3.620	9.9	49.5	40.6	32.5	4.3	-44.5	0.1	1.0	42.9	34.0	74.0	54.0	-31.1	-20.0	905MHz, 4th. Y, V
3.620	9.9	50.2	43.1	32.5	4.3	-44.5	0.1	1.0	43.5	36.5	74.0	54.0	-30.5	-17.5	905MHz, 4th. Y, H
4.525	9.9	52.0	46.0	33.6	4.8	-45.3	0.1	1.0	46.2	40.1	74.0	54.0	-27.8	-13.9	905MHz, 5th. Y, V
4.525	9.9	50.9	43.8	33.6	4.8	-45.3	0.1	1.0	45.0	37.9	74.0	54.0	-29.0	-16.1	905MHz, 5th. Y, H
5.430	9.9	51.5	43.2	34.4	5.3	-46.0	0.1	1.0	46.3	38.1	74.0	54.0	-27.7	-15.9	905MHz, 6th. Y, V
5.430	9.9	51.7	44.2	34.4	5.3	-46.0	0.1	1.0	46.5	39.0	74.0	54.0	-27.5	-15.0	905MHz, 6th. Y, H
6.335	9.9	52.8	46.3	35.8	5.8	-46.4	0.1	1.0	49.1	42.5	74.0	54.0	-24.9	-11.5	905MHz, 7th. Y, V
6.335	9.9	53.7	48.8	35.8	5.8	-46.4	0.1	1.0	49.9	45.0	74.0	54.0	-24.1	-9.0	905MHz, 7th. Y, H
7.240	9.9	51.4	43.7	37.2	6.3	-46.6	0.1	1.0	49.4	41.6	74.0	54.0	-24.6	-12.4	905MHz, 8th. Y, V
7.240	9.9	52.7	45.8	37.2	6.3	-46.6	0.1	1.0	50.7	43.7	74.0	54.0	-23.3	-10.3	905MHz, 8th. Y, H
8.145	9.9	50.6	40.6	38.1	6.7	-46.2	0.1	1.0	50.3	40.3	74.0	54.0	-23.7	-13.7	905MHz, 9th. Y, V
8.145	9.9	50.6	38.8	38.1	6.7	-46.2	0.1	1.0	50.3	38.4	74.0	54.0	-23.7	-15.6	905MHz, 9th. Y, H
9.050	9.9	46.0	35.4	39.4	7.1	-45.8	0.1	1.0	47.8	37.2	74.0	54.0	-26.2	-16.8	10th. Y, Noise Floor
								1.0							V
								1.0							V
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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EMCO Horn 1-18GHz		Pre-amplifier 1-26GHz		Spectrum Analyzer		Horn > 18GHz	
T60; S/N: 2238 @ 1m							
Hi Frequency Cables e (2 ft) e (2 ~ 3 ft) e (4 ~ 6 ft) b (12 ft)							
				Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth		Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth	

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T60; S/N: 2238 @ 1m	T86 Miteq 924341	HP 8593EM Analyzer	
Hi Frequency Cables			
e (2 ft) e (2 ~ 3 ft) b (4 ~ 6 ft) b (12 ft)			
Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth			

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.745	9.9	58.0	55.9	30.8	3.8	-44.0	0.1	1.0	49.7	47.6	74.0	54.0	-24.3	-6.4	915MHz, 3rd, Y, V
2.745	9.9	56.9	54.0	30.8	3.8	-44.0	0.1	1.0	48.6	45.7	74.0	54.0	-25.4	-8.3	915MHz, 3rd, Y, H
3.660	9.9	49.5	37.2	32.6	4.4	-44.5	0.1	1.0	43.0	30.7	74.0	54.0	-31.0	-23.3	915MHz, 4th, Y, V
3.660	9.9	53.4	50.0	32.6	4.4	-44.5	0.1	1.0	46.8	43.5	74.0	54.0	-27.2	-10.5	915MHz, 4th, Y, H
4.575	9.9	50.1	42.0	33.6	4.9	-45.4	0.1	1.0	44.2	36.2	74.0	54.0	-29.8	-17.8	915MHz, 5th, Y, V
4.575	9.9	51.1	43.0	33.6	4.9	-45.4	0.1	1.0	45.3	37.2	74.0	54.0	-28.7	-16.8	915MHz, 5th, Y, H
5.490	9.9	50.1	40.2	34.5	5.4	-46.0	0.1	1.0	45.0	35.1	74.0	54.0	-29.0	-18.9	915MHz, 6th, Y, V
5.490	9.9	50.2	41.1	34.5	5.4	-46.0	0.1	1.0	45.2	36.0	74.0	54.0	-28.8	-18.0	915MHz, 6th, Y, H
6.405	9.9	52.7	46.4	35.9	5.8	-46.4	0.1	1.0	49.0	42.8	74.0	54.0	-25.0	-11.2	915MHz, 7th, Y, V
6.405	9.9	53.3	46.9	35.9	5.8	-46.4	0.1	1.0	49.6	43.3	74.0	54.0	-24.4	-10.7	915MHz, 7th, Y, H
7.320	9.9	52.4	44.6	37.3	6.3	-46.6	0.1	1.0	50.5	42.6	74.0	54.0	-23.5	-11.4	915MHz, 8th, Y, V
7.320	9.9	51.7	43.9	37.3	6.3	-46.6	0.1	1.0	49.7	42.0	74.0	54.0	-24.3	-12.0	915MHz, 8th, Y, H
8.235	9.9	50.6	38.2	38.2	6.7	-46.2	0.1	1.0	50.5	38.1	74.0	54.0	-23.5	-15.9	915MHz, 9th, Y, V
8.235	9.9	50.2	38.4	38.2	6.7	-46.2	0.1	1.0	50.1	38.2	74.0	54.0	-23.9	-15.8	915MHz, 9th, Y, H
9.150	9.9	49.6	36.4	39.3	7.2	-45.7	0.1	1.0	51.4	38.2	74.0	54.0	-22.6	-15.8	10th, Y, Noise Floor
								1.0							V
								1.0							V
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
								1.0							H
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CL	Cable Loss	HPF	High Pass Filter		

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Hi Frequency Cables

e (2 ft)	e (2 ~ 3 ft)	e (4 ~ 6 ft)	b (12 ft)
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Peak Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

[illegible]

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Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
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f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.774	9.9	60.1	58.4	30.8	3.8	-44.0	0.1	1.0	51.9	50.2	74.0	54.0	-22.1	-3.8	924.6MHz, 3rd, Y, V
2.774	9.9	55.2	51.6	30.8	3.8	-44.0	0.1	1.0	47.0	43.3	74.0	54.0	-27.0	-10.7	924.6MHz, 3rd, Y, H
2.774	9.9	59.9	57.9	30.8	3.8	-44.0	0.1	1.0	51.7	49.6	74.0	54.0	-22.3	-4.4	924.6MHz, 3rd, X, H
2.774	9.9	58.3	55.1	30.8	3.8	-44.0	0.1	1.0	50.1	46.9	74.0	54.0	-23.9	-7.1	924.6MHz, 3rd, X, V
3.698	9.9	49.9	42.4	32.6	4.4	-44.6	0.1	1.0	43.4	35.9	74.0	54.0	-30.6	-18.1	924.6MHz, 4th, Y, V
3.698	9.9	50.8	44.0	32.6	4.4	-44.6	0.1	1.0	44.3	37.5	74.0	54.0	-29.7	-16.5	924.6MHz, 4th, Y, H
3.698	9.9	48.9	41.0	32.6	4.4	-44.6	0.1	1.0	42.4	34.5	74.0	54.0	-31.6	-19.5	924.6MHz, 4th, X, H
3.698	9.9	49.6	42.3	32.6	4.4	-44.6	0.1	1.0	43.2	35.8	74.0	54.0	-30.8	-18.2	924.6MHz, 4th, X, V
4.623	9.9	48.9	37.9	33.6	4.9	-45.4	0.1	1.0	43.0	32.1	74.0	54.0	-31.0	-21.9	924.6MHz, 5th, X, V
4.623	9.9	49.0	37.9	33.6	4.9	-45.4	0.1	1.0	43.2	32.1	74.0	54.0	-30.8	-21.9	924.6MHz, 5th, X, H
4.623	9.9	49.4	41.4	33.6	4.9	-45.4	0.1	1.0	43.6	35.6	74.0	54.0	-30.4	-18.4	924.6MHz, 5th, Y, H
4.623	9.9	52.4	47.7	33.6	4.9	-45.4	0.1	1.0	46.6	41.9	74.0	54.0	-27.4	-12.1	924.6MHz, 5th, Y, V
5.548	9.9	52.4	42.9	34.6	5.4	-46.0	0.1	1.0	47.4	37.9	74.0	54.0	-26.6	-16.1	924.6MHz, 6th, Y, V
5.548	9.9	49.6	39.2	34.6	5.4	-46.0	0.1	1.0	44.6	34.2	74.0	54.0	-29.4	-19.8	924.6MHz, 6th, Y, H
5.548	9.9	49.6	40.8	34.6	5.4	-46.0	0.1	1.0	44.6	35.8	74.0	54.0	-29.4	-18.2	924.6MHz, 6th, X, V
5.548	9.9	49.9	41.2	34.6	5.4	-46.0	0.1	1.0	44.9	36.2	74.0	54.0	-29.1	-17.8	924.6MHz, 6th, X, V
6.472	9.9	49.7	40.7	36.0	5.9	-46.5	0.1	1.0	46.2	37.2	74.0	54.0	-27.8	-16.8	924.6MHz, 7th, Y, V
6.472	9.9	52.4	45.8	36.0	5.9	-46.5	0.1	1.0	48.9	42.3	74.0	54.0	-25.1	-11.7	924.6MHz, 7th, Y, H
6.472	9.9	51.1	40.7	36.0	5.9	-46.5	0.1	1.0	47.6	37.2	74.0	54.0	-26.4	-16.8	924.6MHz, 7th, X, H
6.472	9.9	51.2	41.7	36.0	5.9	-46.5	0.1	1.0	47.7	38.2	74.0	54.0	-26.3	-15.8	924.6MHz, 7th, X, V
7.397	9.9	50.7	44.1	37.4	6.3	-46.5	0.1	1.0	48.9	42.3	74.0	54.0	-25.1	-11.7	924.6MHz, 8th, Y, V
7.397	9.9	51.9	45.3	37.4	6.3	-46.5	0.1	1.0	50.1	43.5	74.0	54.0	-23.9	-10.5	924.6MHz, 8th, Y, H
7.397	9.9	50.0	43.4	37.4	6.3	-46.5	0.1	1.0	48.2	41.6	74.0	54.0	-25.8	-12.4	924.6MHz, 8th, X, H
7.397	9.9	50.8	44.2	37.4	6.3	-46.5	0.1	1.0	49.0	42.4	74.0	54.0	-25.0	-11.6	924.6MHz, 8th, X, V
8.321	9.9	50.5	40.1	38.4	6.8	-46.1	0.1	1.0	50.6	40.2	74.0	54.0	-23.4	-13.8	924.6MHz, 9th, Y, V
8.321	9.9	49.0	37.1	38.4	6.8	-46.1	0.1	1.0	49.1	37.2	74.0	54.0	-24.9	-16.8	924.6MHz, 9th, Y, H
8.321	9.9	48.8	35.9	38.4	6.8	-46.1	0.1	1.0	48.9	36.0	74.0	54.0	-25.1	-18.0	924.6MHz, 9th, X, H
8.321	9.9	49.0	37.7	38.4	6.8	-46.1	0.1	1.0	49.1	37.8	74.0	54.0	-24.9	-16.2	924.6MHz, 9th, X, V
9.246	9.9	46.4	34.5	39.3	7.2	-45.6	0.1	1.0	48.3	36.4	74.0	54.0	-25.7	-17.6	Noise Floor, Y, V
9.246	9.9	46.2	34.7	39.3	7.2	-45.6	0.1	1.0	48.2	36.7	74.0	54.0	-25.8	-17.3	Noise Floor, Y, H
								1.0							H

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