

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.209

FCC Part 15 Subpart C Section 15.207

MANUFACTURER'S NAME	Colder Products
NAME OF EQUIPMENT	Panel Mount UDC RFID Reader
MODEL NUMBER(S) TESTED	IUDC12-PM
MANUFACTURER'S ADDRESS	1001 Westgate Drive Saint Paul MN 55114
TEST REPORT NUMBER	WC701077
TEST DATE(S)	30 March 2007


According to testing performed at TÜV America Inc, the above-mentioned unit is in compliance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 15 Subpart C Sections 15.207 and 15.209.

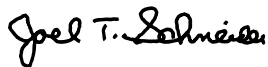
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C "Intentional radiators" Sections 15.207 "Conducted Limits" and 15.209 "Radiated emission limits; General requirements".

Date: 10 April 2007

Location: Taylors Falls MN
USA


T. K. Swanson
Senior EMC Technician


J. T. Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report File No. : **WC701077** Date of issue: 10 April 2007

Model / Serial No(s) Tested : IUDC12-PM / 4350430000147576

Product Type : Panel Mount UDC RFID Reader

Manufacturer : Colder Products

Address : 1001 Westgate Drive
Saint Paul MN 55114

Test Result : ☒ **Positive** ☐ **Negative**

Test Project Number
References : **WC701077**

Total pages including
Appendices : **30**

TÜV America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV America Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP, NIST, or any agency of the US government.

TÜV America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI.

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Sign Explanations:

- ☐ - not applicable
- ☒ - applicable

EMC TEST REGULATIONS:

The tests were performed according to the following regulations :

- ☐ - EN 55014-2: 1997 + Amendment A1: 2001 - Category ____
- ☐ - EN 55024: 1998 + Amendments A1: 2001 + A2: 2003
- ☐ - EN 60601-1-2: 2001
- ☐ - EN 61000-6-1: 2001
- ☐ - EN 61000-6-2: 2001
- ☐ - EN 61326: 1997 + Amendments A1: 1998 + A2: 2001 + A3: 2003
- ☐ - EN 61800-3: 1996 + Amendment A11: 2000
- ☐ - ETS 300 683: 1997
- ☐ - ETSI EN 301 489-3 V1.4.1: 2002
- ☐ - EN 300 330-2 V1.1.1 (2001-06)
- ☒ - FCC Part 15 Subpart C Section 15.209
- ☒ - FCC Part 15 Subpart C Section 15.207

- ☐ - IC RSS-210 Issue 6 Section 2.6
- ☐ - IC RSS-Gen Issue 1

ENVIRONMENTAL CONDITIONS IN THE LAB

Temperature:	<u>Actual</u> : 19 °C
Atmospheric pressure	: 99.7 kPa
Relative Humidity	: 52 %

POWER SUPPLY UTILIZED

Power supply system : 60 Hz – 120 VAC – 1 Phase

General field strength limits 0.009 – 30 MHz

FCC 15.209(a), IC RSS-210 2.6

Test summary

The requirements are: ■ - MET □ - NOT MET

The fundamental field strength is 3.16 uV/m (10 dBuV/m) at 13.56 MHz at 30 meters (extrapolated) with quasi-peak detection vs. limit of 30 uV/m (29.54 dBuV/m)

The maximum spurious field strength is 0.125 uV/m (-18 dBuV/m) at 27.12 MHz at 30 meters (extrapolated) with quasi-peak detection vs. limit of 30 uV/m (29.54 dBuV/m)

Test location

□ - Wild River Lab Large Test Site (Open Area Test Site)

■ - Wild River Lab Small Test Site (Open Area Test Site)

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	22-Mar-08
2517	HFH2-Z2	Polorad	Loop Antenna	879285/036	30-May-07

Test limits

Frequency (MHz)	Field strength (uV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30	30	30

Fundamental Test data – Quasi-Peak emission measurements (dBuV/m)

	1 m	3 m	10 m	30 m*	Limit	Margin of Compliance
(MHz)	QP	QP	QP	QP	QP	
13.56	77	54	32	10*	29.54	19.54

* Extrapolated value using 44 dB per decade roll off as demonstrated by the measurements

Spurious Test data - Quasi peak emission measurements (dBuV/m)

	3 m	10 m	30 m	Limit	Margin of Compliance
(MHz)	Qp	QP	Qp	Qp	
27.12	26		-18*	29.54	47.54

* Extrapolated values using 44 dB per decade roll off as demonstrated by the measurements

Conducted Emissions 150 kHz – 30 MHz

FCC 15.207(a), RSS-Gen, 7.2.2

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum margin of compliance is 5 dB at 13.56 MHz

Test location

☐ - Wild River Lab Large Test Site (Open Area Test Site)

☒ - Wild River Lab Small Test Site (Open Area Test Site)

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2417	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1439	Code B
2534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	27-Feb-07

Cal Code B = Calibration verification performed internally.

Test limits

Frequency (MHz)	Quasi-Peak (dB μ V)	Average (dB μ V)
.15 - .5	66 to 56*	56 to 46*
.5 - 5	56	46
5 - 30	60	50

Decreases with the logarithm of the frequency

Test data on following page

CONDUCTED EMISSIONS



Test Report #: WC701077 Run 4 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 100.0 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 1 of 4

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN55022 B Qp	DELTA2 EN55022 B Avg
150.0 kHz	30.86 Qp	0.23 / 0.2 / 0.0 / 0.0	31.29	N	-34.71	n/a
150.0 kHz	5.31 Av	0.23 / 0.2 / 0.0 / 0.0	5.74	N	n/a	-50.26
195.0 kHz	30.24 Qp	0.25 / 0.17 / 0.0 / 0.0	30.66	N	-33.16	n/a
195.0 kHz	7.36 Av	0.25 / 0.17 / 0.0 / 0.0	7.78	N	n/a	-46.04
525.0 kHz	27.32 Qp	0.34 / 0.1 / 0.0 / 0.0	27.76	N	-28.24	n/a
525.0 kHz	0.07 Av	0.34 / 0.1 / 0.0 / 0.0	0.51	N	n/a	-45.49
590.0 kHz	22.9 Qp	0.36 / 0.1 / 0.0 / 0.0	23.36	N	-32.64	n/a
590.0 kHz	-2.41 Av	0.36 / 0.1 / 0.0 / 0.0	-1.95	N	n/a	-47.95
878.82 kHz	16.02 Qp	0.42 / 0.1 / 0.0 / 0.0	16.54	N	-39.46	n/a
878.82 kHz	-5.23 Av	0.42 / 0.1 / 0.0 / 0.0	-4.71	N	n/a	-50.71
13.565 MHz	51.12 Qp	1.9 / 0.24 / 0.0 / 0.0	53.27	N	-6.73	n/a
13.565 MHz	40.72 Av	1.9 / 0.24 / 0.0 / 0.0	42.87	N	n/a	-7.13
27.125 MHz	33.24 Qp	2.7 / 0.79 / 0.0 / 0.0	36.73	N	-23.27	n/a
27.125 MHz	25.03 Av	2.7 / 0.79 / 0.0 / 0.0	28.52	N	n/a	-21.48
150.0 kHz	31.88 Qp	0.23 / 0.2 / 0.0 / 0.0	32.31	L1	-33.69	n/a
150.0 kHz	13.53 Av	0.23 / 0.2 / 0.0 / 0.0	13.96	L1	n/a	-42.04
195.0 kHz	32.72 Qp	0.25 / 0.17 / 0.0 / 0.0	33.14	L1	-30.68	n/a
195.0 kHz	11.8 Av	0.25 / 0.17 / 0.0 / 0.0	12.22	L1	n/a	-41.6
525.0 kHz	30.98 Qp	0.34 / 0.1 / 0.0 / 0.0	31.42	L1	-24.58	n/a
525.0 kHz	4.28 Av	0.34 / 0.1 / 0.0 / 0.0	4.72	L1	n/a	-41.28
590.0 kHz	30.82 Qp	0.36 / 0.1 / 0.0 / 0.0	31.28	L1	-24.72	n/a
590.0 kHz	3.66 Av	0.36 / 0.1 / 0.0 / 0.0	4.12	L1	n/a	-41.88
878.82 kHz	19.62 Qp	0.42 / 0.1 / 0.0 / 0.0	20.14	L1	-35.86	n/a
878.82 kHz	-3.09 Av	0.42 / 0.1 / 0.0 / 0.0	-2.57	L1	n/a	-48.57
13.565 MHz	51.92 Qp	1.9 / 0.24 / 0.0 / 0.0	54.07	L1	-5.93	n/a

Tested by: T. K. Swanson

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CONDUCTED EMISSIONS



Test Report #: WC701077 Run 4 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 100.0 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes: _____

Data File Name: 1077.dat

Page: 2 of 4

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN55022 B Qp	DELTA2 EN55022 B Avg
13.565 MHz	41.28 Av	1.9 / 0.24 / 0.0 / 0.0	43.43	L1	n/a	-6.57
27.125 MHz	32.02 Qp	2.7 / 0.79 / 0.0 / 0.0	35.51	L1	-24.49	n/a
27.125 MHz	22.5 Av	2.7 / 0.79 / 0.0 / 0.0	25.99	L1	n/a	-24.01
End of scan						

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CONDUCTED EMISSIONS



Test Report #: WC701077 Run 4 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 100.0 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 3 of 4

Measurement summary for limit1: EN55022 B Qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN55022 B Qp
13.565 MHz	51.92 Qp	1.9 / 0.24 / 0.0 / 0.0	54.07	L1	-5.93
27.125 MHz	33.24 Qp	2.7 / 0.79 / 0.0 / 0.0	36.73	N	-23.27
525.0 kHz	30.98 Qp	0.34 / 0.1 / 0.0 / 0.0	31.42	L1	-24.58
590.0 kHz	30.82 Qp	0.36 / 0.1 / 0.0 / 0.0	31.28	L1	-24.72
195.0 kHz	32.72 Qp	0.25 / 0.17 / 0.0 / 0.0	33.14	L1	-30.68
150.0 kHz	31.88 Qp	0.23 / 0.2 / 0.0 / 0.0	32.31	L1	-33.69
878.82 kHz	19.62 Qp	0.42 / 0.1 / 0.0 / 0.0	20.14	L1	-35.86

Measurement summary for limit2: EN55022 B Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA2 EN55022 B Avg
13.565 MHz	41.28 Av	1.9 / 0.24 / 0.0 / 0.0	43.43	L1	-6.57
27.125 MHz	25.03 Av	2.7 / 0.79 / 0.0 / 0.0	28.52	N	-21.48
525.0 kHz	4.28 Av	0.34 / 0.1 / 0.0 / 0.0	4.72	L1	-41.28
195.0 kHz	11.8 Av	0.25 / 0.17 / 0.0 / 0.0	12.22	L1	-41.6
590.0 kHz	3.66 Av	0.36 / 0.1 / 0.0 / 0.0	4.12	L1	-41.88
150.0 kHz	13.53 Av	0.23 / 0.2 / 0.0 / 0.0	13.96	L1	-42.04
878.82 kHz	-3.09 Av	0.42 / 0.1 / 0.0 / 0.0	-2.57	L1	-48.57

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CONDUCTED EMISSIONS



Test Report #: WC701077 Run 4 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 100.0 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

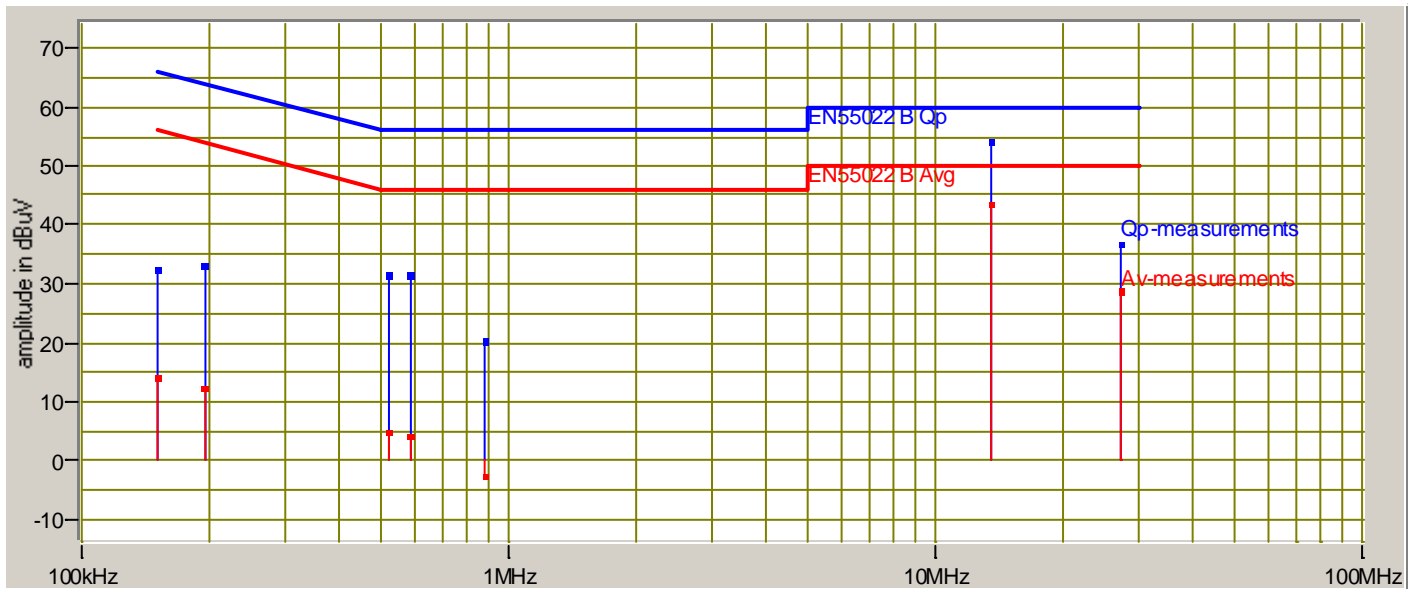
EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 4 of 4

Graph:



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Radiated Emissions 30 - 1000 MHz

FCC 15.209(f), IC RSS-210 2.6

Test summary

The requirements are: ☒ - MET ☐ - NOT MET
Minimum margin of compliance is 5 dB at 40.6 MHz

Test location

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
☒ - Wild River Lab Small Test Site (Open Area Test Site)

Test Equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3995	EM-6917B	Electro-Metrics	Biconicalog Periodic	151	31-Mar-07
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	28-Mar-07
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	28-Mar-07
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	29-Nov-07
2665	ZHL-1042J	Mini-Circuits	Preamplifier 30 - 5000 MHz	32296	Code B

Cal Code B = Calibration verification performed internally.

Test limits

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test data on following page

RADIATED EMISSIONS



Test Report #: WC701077 Run 3 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 99.7 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 1 of 4

List of measurements for run #: 3

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
40.68 MHz	43.25 Qp	1.13 / 16.74 / 27.51 / 0.0	33.61	V / 1.00 / 0	-6.39	n/a
54.24 MHz	31.7 Qp	1.31 / 12.88 / 27.73 / 0.0	18.16	V / 1.00 / 0	-21.84	n/a
67.8 MHz	35.6 Qp	1.39 / 10.19 / 27.88 / 0.0	19.3	V / 1.00 / 0	-20.7	n/a
81.36 MHz	39.95 Qp	1.56 / 7.91 / 27.78 / 0.0	21.64	V / 1.00 / 0	-18.36	n/a
94.92 MHz	47.65 Qp	1.72 / 7.99 / 27.68 / 0.0	29.69	V / 1.00 / 0	-13.81	n/a
108.48 MHz	49.8 Qp	1.81 / 8.94 / 27.63 / 0.0	32.93	V / 1.00 / 0	-10.57	n/a
122.04 MHz	48.71 Qp	1.9 / 8.91 / 27.75 / 0.0	31.77	V / 1.00 / 0	-11.73	n/a
135.6 MHz	52.05 Qp	1.96 / 8.07 / 27.87 / 0.0	34.21	V / 1.00 / 0	-9.29	n/a
77.975 MHz	39.0 Qp	1.53 / 8.48 / 27.8 / 0.0	21.21	V / 1.00 / 45	-18.79	n/a
81.365 MHz	39.65 Qp	1.56 / 7.91 / 27.78 / 0.0	21.34	V / 1.00 / 45	-18.66	n/a
40 MHz maxed						
40.68 MHz	43.88 Qp	1.13 / 16.74 / 27.51 / 0.0	34.24	V / 1.00 / 350	-5.76	n/a
135 MHz maxed						
135.6 MHz	52.04 Qp	1.96 / 8.07 / 27.87 / 0.0	34.2	V / 1.00 / 0	-9.3	n/a
67.8 MHz	37.2 Qp	1.39 / 10.19 / 27.88 / 0.0	20.9	H / 2.50 / 100	-19.1	n/a
94.92 MHz	44.85 Qp	1.72 / 7.99 / 27.68 / 0.0	26.89	H / 2.50 / 100	-16.61	n/a
108.48 MHz	46.2 Qp	1.81 / 8.94 / 27.63 / 0.0	29.33	H / 2.50 / 100	-14.17	n/a
122.04 MHz	43.65 Qp	1.9 / 8.91 / 27.75 / 0.0	26.71	H / 2.50 / 100	-16.79	n/a
135.6 MHz	46.25 Qp	1.96 / 8.07 / 27.87 / 0.0	28.41	H / 2.50 / 100	-15.09	n/a

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Thomas K. Swanson

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Reviewed by: J. T. Schneider

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Joel T. Schneider

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RADIATED EMISSIONS



Test Report #: WC701077 Run 3 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 99.7 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes: _____

Data File Name: 1077.dat

Page: 2 of 4

List of measurements for run #: 3

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
135 MHz maxed						
135.6 MHz	47.7 Qp	1.96 / 8.07 / 27.87 / 0.0	29.86	H / 2.50 / 265	-13.64	n/a
108 MHz maxed						
108.48 MHz	48.45 Qp	1.81 / 8.94 / 27.63 / 0.0	31.58	H / 2.00 / 265	-11.92	n/a
End of scan 30 to 135.6 MHz						

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RADIATED EMISSIONS



Test Report #: WC701077 Run 3 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 99.7 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 3 of 4

Measurement summary for limit1: FCC-B <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
40.68 MHz	43.88 Qp	1.13 / 16.74 / 27.51 / 0.0	34.24	V / 1.00 / 350	-5.76
135.6 MHz	52.05 Qp	1.96 / 8.07 / 27.87 / 0.0	34.21	V / 1.00 / 0	-9.29
108.48 MHz	49.8 Qp	1.81 / 8.94 / 27.63 / 0.0	32.93	V / 1.00 / 0	-10.57
122.04 MHz	48.71 Qp	1.9 / 8.91 / 27.75 / 0.0	31.77	V / 1.00 / 0	-11.73
94.92 MHz	47.65 Qp	1.72 / 7.99 / 27.68 / 0.0	29.69	V / 1.00 / 0	-13.81
81.36 MHz	39.95 Qp	1.56 / 7.91 / 27.78 / 0.0	21.64	V / 1.00 / 0	-18.36
77.975 MHz	39.0 Qp	1.53 / 8.48 / 27.8 / 0.0	21.21	V / 1.00 / 45	-18.79
67.8 MHz	37.2 Qp	1.39 / 10.19 / 27.88 / 0.0	20.9	H / 2.50 / 100	-19.1
54.24 MHz	31.7 Qp	1.31 / 12.88 / 27.73 / 0.0	18.16	V / 1.00 / 0	-21.84

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RADIATED EMISSIONS



Test Report #: WC701077 Run 3 Test Area: STS

EUT Model #: IUDC12-PM Date: 3/30/2007

EUT Serial #: 43504300001475576N/A EUT Power: 60 Hz 120 VAC Temperature: 19.0 °C

Test Method: FCC B Air Pressure: 99.7 kPa

Customer: COLDER PRODUCTS Rel. Humidity: 52.0 %

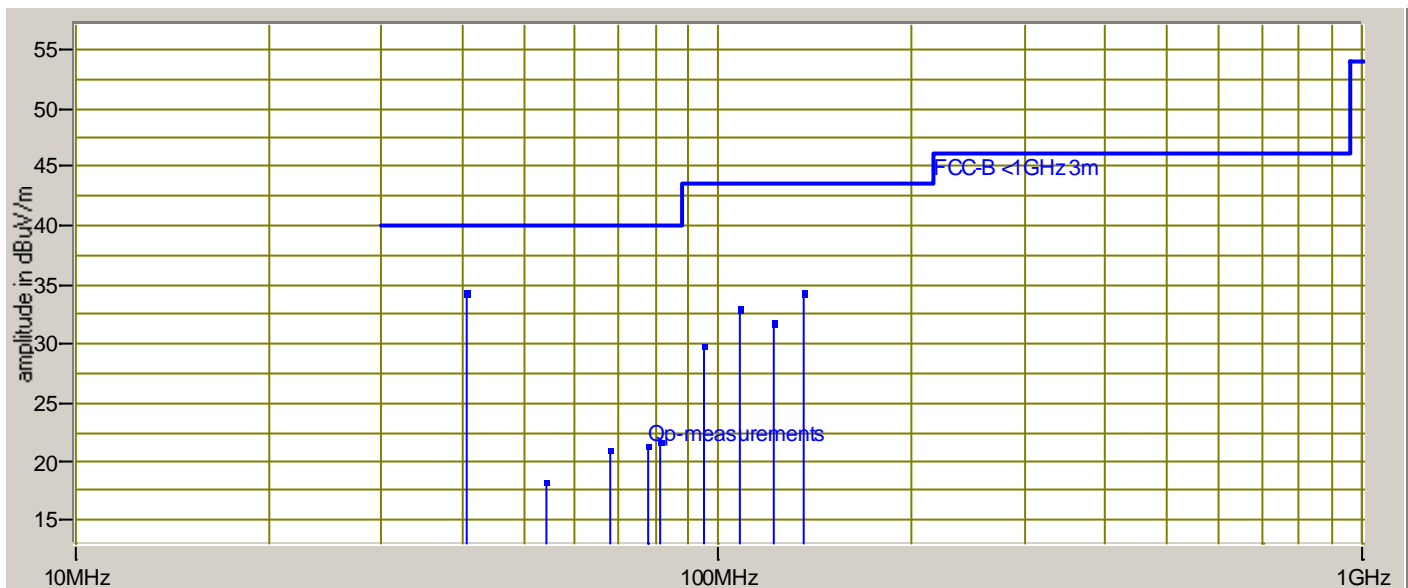
EUT Description: Panel Mount UDC RFID Reader

Notes:

Data File Name: 1077.dat

Page: 4 of 4

Graph:



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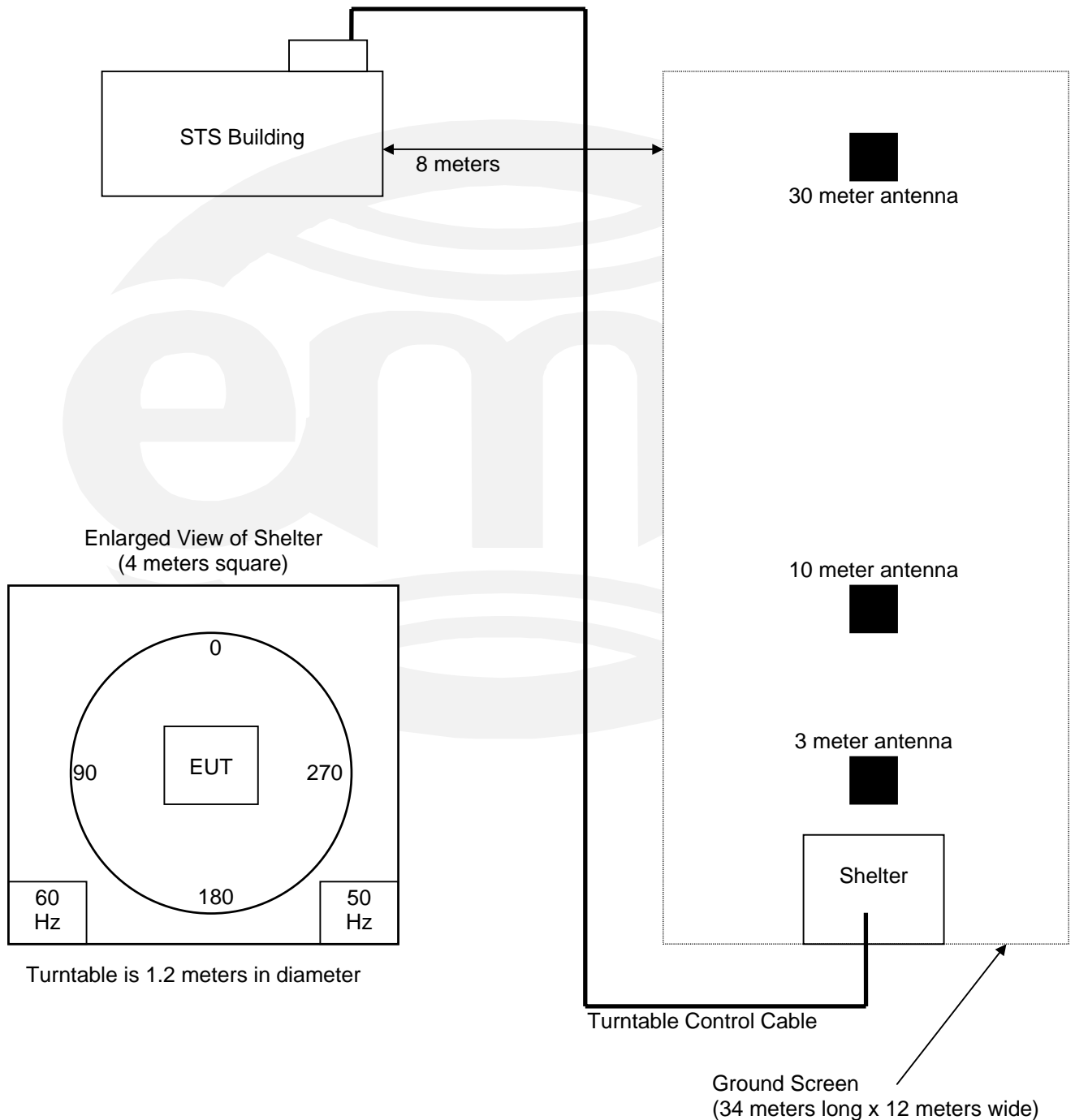
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TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Small Test Site (STS)



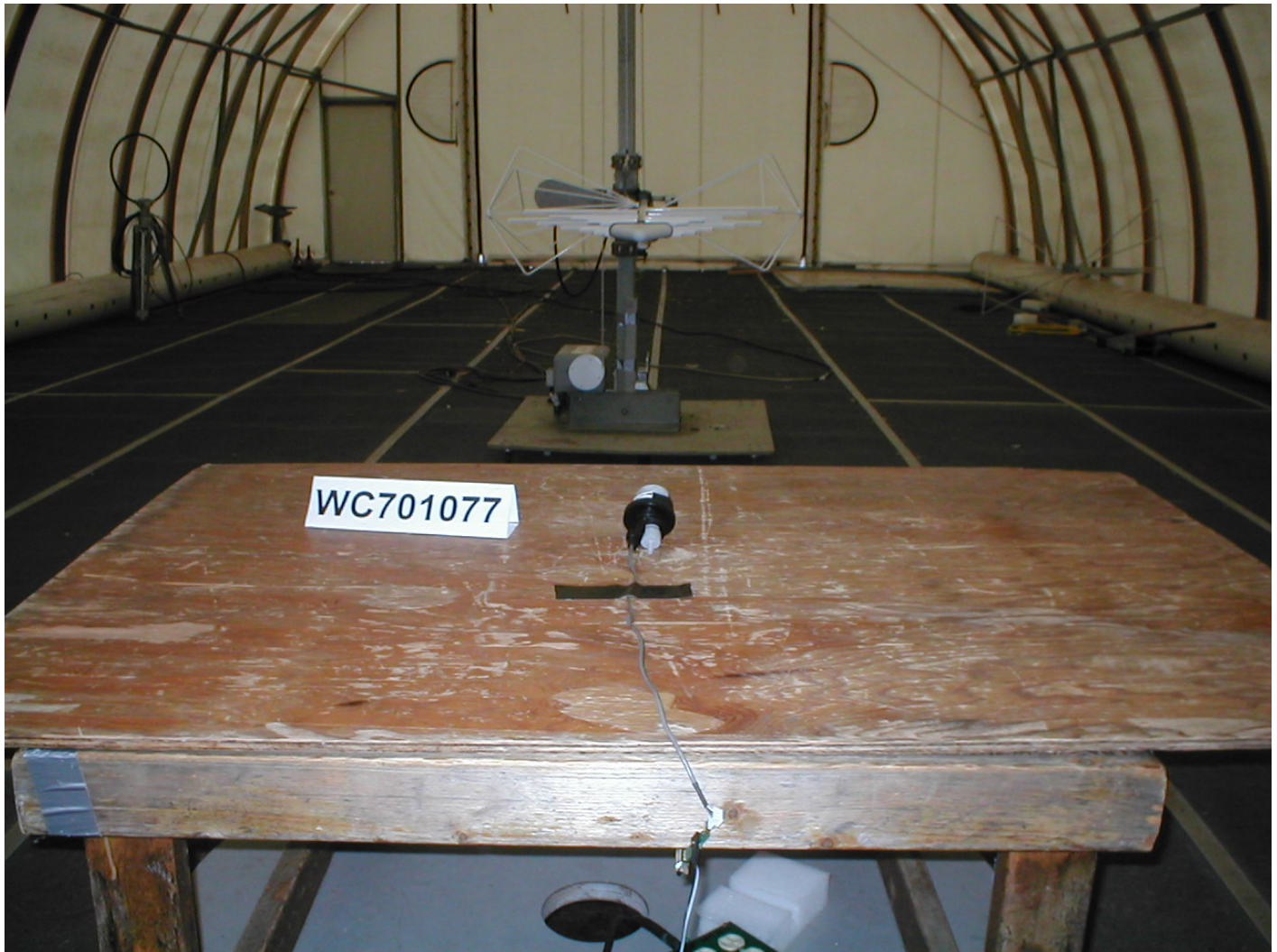
Test-setup photo(s):
General Field Strength Limits 0.009 – 30 MHz



Test-setup photo(s):
Conducted Emissions 150 kHz - 30 MHz



Test-setup photo(s):
Radiated Emissions 30 - 1000 MHz



Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions during testing :

- ☐ - Standby
 - ☐ - Test program (H - Pattern)
 - ☐ - Test program (color bar)
 - ☐ - Test program (customer specific)
 - ☐ - Practice operation
 - ☐ - Normal operating mode
 - ☒ - High speed fully automatic mode. RFID reader turns on FR looks for a RFID tag and, if seen, reads all of the information on the tag and transmits it to the host. The device will enter this mode upon power-up. The read rate will be approximately 50 times per second.
-

Configuration of the device under test:

- ☒ - See Appendix A & B
- ☐ - See Product Information Form(s) in Appendix B

DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

Modifications required to pass:

- ☒ None
- ☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

- ☒ None
- ☐ As indicated in the Test Plan
- ☐

SUMMARY:

The requirements according to the technical regulations are

- ☒ - met and the device under test does fulfill the general approval requirements.
- ☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

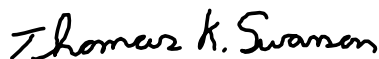
EUT Received Date: 30 March 2007

Condition of EUT: Normal

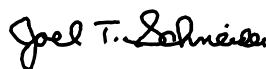
Testing Start Date: 30 March 2007

Testing End Date: 30 March 2007

TÜV AMERICA INC



T. K. Swanson
Senior EMC Technician



J. T. Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form





EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.

Company: Colder Products
 Address: 1001 Westgate Dr
Saint Paul, Mn 55114
 Contact: Bill Rankin Position: Electronics Manager
 Phone: 651-603-2558 Fax: _____
 E-mail Address: bill.rankin@colder.com

General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description 13.56MHz RFID reader
 EUT Name Panel Mount UDC RFID Reader
 Model No.: IUDC12-PM Serial No.: 4350430000147576
 Product Options: RS-232 or RS-422 interface, Various hose barb sizes, Coupler body material Poly-pro, Aceta, various o-ring material
 Configurations to be tested: RS-422, 1/4 Hose barb, poly-pro, EPDM o-rings

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)

Modifications since last test: None
 Modifications made during test: None

Test Objective(s): Please indicate the tests to be performed, entering the applicable standard(s) where noted.

- | | |
|--|--|
| <input type="checkbox"/> EMC Directive 89/336/EEC (EMC)
Std: _____ | <input checked="" type="checkbox"/> FCC: Class <input type="checkbox"/> A <input checked="" type="checkbox"/> B Part _____ |
| <input type="checkbox"/> Machinery Directive 89/392/EEC (EMC)
Std: _____ | <input type="checkbox"/> VCCI: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Medical Device Directive 93/42/EEC (EMC)
Std: _____ | <input type="checkbox"/> BSMI: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Vehicle Directive 72/245/EEC (EMC)
Std: _____ | <input type="checkbox"/> Canada: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| | <input type="checkbox"/> Other: _____ |

Third Party Certification, if applicable (*Signature on Page 6 Required)

- | | |
|---|---|
| <input type="checkbox"/> Attestation of Conformity (AoC)* | <input type="checkbox"/> EMC Certification (used with Octagon Mark)* |
| <input type="checkbox"/> Certificate of Conformity (CoC)* | <input type="checkbox"/> Compliance Document* |
| Protection Class (N/A for vehicles) | <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III |
- (Press F1 when field is selected to show additional information on Protection Class.)



EMC Test Plan and Constructional Data Form

America

- ☐ FCC / TCB Certification
☐ E-Mark Certification

- ☐ Industry Canada / FCB Certification
☐ Taiwan Certification

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - Complete this section if testing will not be attended by the customer.

If a failure occurs, TÜV SÜD America should:

- ☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____
☐ Continue testing to complete test series.
☐ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length: 3.25 in Width: 2.5 Height: 2.5 Weight: 1lb

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 12VDC (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: N.A.

Current (Amps/phase(max)): 0.2amp Current (Amps/phase(nominal)): 0.1amp

Other designed for 8-24VDC operation, Customer will provide "off the shelf" power supply for conducted emissions

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
 Industrial/Comercial

EUT Power Cable

- ☒ Permanent OR ☐ Removable Length (in meters): 0.6m
☐ Shielded OR ☒ Unshielded
☐ Not Applicable



EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables														
Type	Analog	Digital	During Test		Qty	Shielding		Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent	
			Active	Passive		Yes	No							Type
EXAMPLE:														
RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RS-422	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>					0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>

America

Description: Standard RFID software running in fully automatic mode

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV SÜD America Representative if additional assistance is required.

1. High speed fully automatic mode. RFID reader turns on FR looks for a RFID tag and, if seen, reads all of the information on the tag and transmits it to the host. The device will enter this mode upon power-up. The read rate will be approximately 50 times per second.
- 2.
- 3.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
UDC RFID reader	IUDC12-PM	as above	



EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)
This information is required for FCC & Taiwan testing.

<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
Power Supply	KA12D090030024 U		

Oscillator Frequencies

<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
13.56MHz	13.56MHz	Ccrystal oscillator	Provide clock for the processor and the RFID interface chip. No other clacks are used.

Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
CUI Inc.	KA12D090030 024U		<input type="checkbox"/> Switched-mode: (Frequency) _____ <input checked="" type="checkbox"/> Linear <input type="checkbox"/> Other: _____
			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____

Power Line Filters

<i>Manufacturer</i>	<i>Model #</i>	<i>Location in EUT</i>



EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>
Ferrite beads on all I/O lines	Steward	HZ0805E601R-00	4	Ferrite bead on all I/O lines
Low pass filter on control lines to RF section	TDK	MEM2012T10R0	4	Main Circuit brd. at RF shield
Low pass filter on power going into RF section	TDK	ACF321825-681-T	1	On +5v line into shield
RF Shield over entire RF section	Microphoto	8390006	1	Continuous metal shield over RF section

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

General filtering of power lines with Tant and ceram capacitors

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization Signatures (Signature Required for Certifications checked on pg 1)

Customer authorization to perform tests according to this test plan.

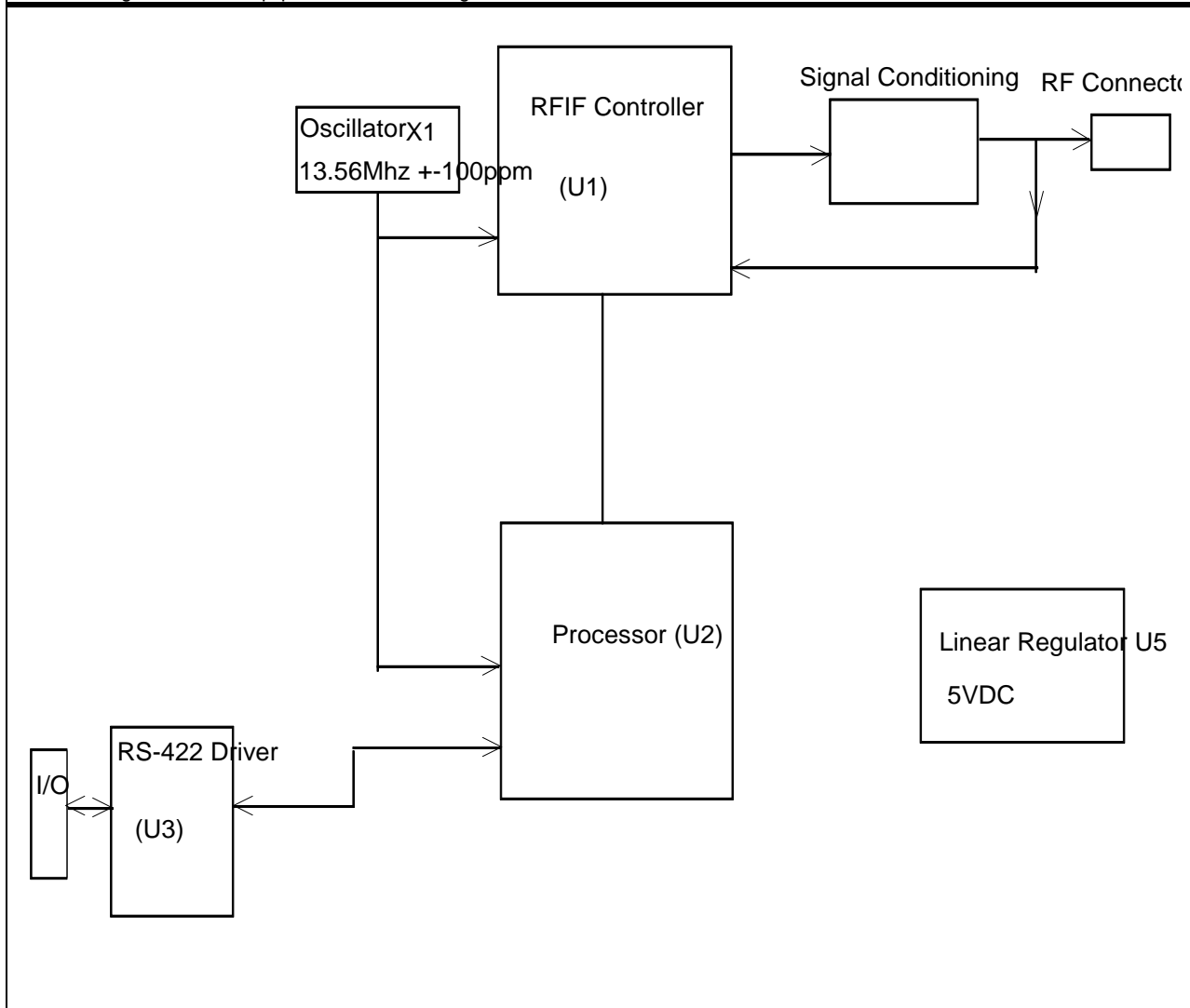
Date

Test Plan/CDF Prepared By (please print)

Date

EMC Block Diagram Form

System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



Authorization Signatures

Bill Rankin

2/27/07

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

Appendix B

Measurement Protocol



MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Emission testing is performed according to the procedures in ANSI C63.4-2003.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ± 1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ± 4.8 dB. The equipment comprising the test systems is calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

Conducted Emissions

The final level, in dB μ V, equals the EMI receiver level plus the cable loss and LISN factor.

Radiated Emissions

The final level, in dB μ V/m, equals the reading from the spectrum analyzer (Level dB μ V), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Attachment A. Intentional radiators are rotated through 3 orthogonal axes to determine the test position yielding the maximum emission levels.

Below 30 MHz, a calibrated loop antenna was positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. For certain applications, the loop antenna may also need to be positioned horizontally at the specified distance from the EUT. The center of the loop was 1 m above the ground.

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Tabletop equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

Example:

FREQ (MHz)	LEVEL (dB μ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dB μ V/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.