TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.225
IC RSS-210 Issue 7
IC RSS-Gen Issue 2

MANUFACTURER'S NAME	Datacard Group 11111 Bren Road West Minnetonka MN 55343
PRODUCT NAME	534508-001, PWA, Antenna, Supplies ID, Gen 3
MODEL NUMBER(S) TESTED	Antenna Supplies ID
SERIAL NUMBER(S) TESTED	19811021000018
PRODUCT DESCRIPTION	13.56 MHz RFID reader
TEST REPORT NUMBER	WC1003460
TEST DATE(S)	19 April & 11 May 2010

TÜV SÜD 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 Section 15.225 and IC RSS-210 Issue 7 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment” and IC RSS-Gen “General Requirements and Information for the Certification of Radiocommunication Equipment”.

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.

Date: 14 May 2010

Location: Taylors Falls MN
USA

Greg Jakubowski
EMC Test Engineer

Joel T Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No.	**WC1003460**	Date of issue:	14 May 2010
Product Name	534508-001, PWA, Antenna, Supplies ID, Gen 3		
Model(s) Tested	Antenna Supplies ID		
Serial No(s) Tested	19811021000018		
Product Description	13.56 MHz RFID reader		
Manufacturer	Datacard Group 11111 Bren Road West Minnetonka MN 55343		

Test Result ■ **Positive** ☐ **Negative**

TÜV SÜD 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 SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.

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

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	34	14 May 2010	Initial Release

DIRECTORY

Contents

EMC TEST REGULATIONS:
The tests were performed according to the following regulations:
FCC Part 15 Subpart C Section 15.225 Paragraphs (a), (b), (c), (d)
IC RSS-210 Issue 7 Section A2.6
IC RSS-Gen Issue 2 Sections 4.6.1, 7.2.2

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 20°C
Atmospheric pressure	: 99kPa
Relative Humidity	: 26%

POWER SUPPLY UTILIZED
Power supply system : 5 VDC

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

SIGN EXPLANATIONS
☐ - not applicable
■ - applicable

Radiated 0.009 – 30 MHz
FCC 15.225(a-d), IC RSS-210 A2.6

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 8.2.2
Minimum margin of compliance of the fundamental carrier is 73.7 dB at 13.56 MHz, field strength is 10.3 dBμV/m* or 3.27 μV/m at 30 meters (this level is below the lowest limit of the emission mask).
Minimum margin of compliance of spurious emissions is 54.5 dB at 27.12 MHz, field strength is -25 dBμV/m* or 0.56 μV/m at 300 meters.
No unwanted emissions exceed the level of the fundamental

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

Test distance
■ - 0.3 meters
■ - 1.0 meter
■ - 3 meters
■ - 10 meters

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02517	HFH2-Z2	Polarad	Loop Antenna	879285/036	01-Jul-10
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver	837055/003	29-Mar-11

Test limit

Frequency (MHz)	Field strength μV/m	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705-13.110 & 14.010-30	30	30
13.553-13.567	15848	30
13.410-13.553 & 13.567-13.710	334	30
13.110-13.410 & 13.710-14.010	106	30

Test Data
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, *e.g.*, see §§ 15.250, 15.252, 15.255, and 15.509–15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Test Data, dBµV/m

	.3 m dBuV/m	1 m dBuV/m	3 m dBuV/m	10 m dBuV/m	30 m dBuV/m	300 m dBuV/m	Limit dBuV/m
(MHz)	**QP**	**QP**	**QP**	**QP**	**QP**	**QP**	**QP**
13.56	82.2	74.1	50.3	36	10.3*	n/a	84
0.1027	76.5	69.1	53	31	Nf	-29*	27.3
27.12	51.1	35	Nf	Nf	-25*	n/a	29.5

* Extrapolated value using 40 dB per decade fall off as demonstrated by the measurements
No other signals detected up to 30 MHz. Nf indicates noise floor.

	.3 m dBuV/m	1 m dBuV/m	3 m dBuV/m	10 m dBuV/m	30 m dBuV/m	300 m dBuV/m	Limit dBuV/m
(MHz)	**Pk/Av**	**Pk/Av**	**Pk/Av**	**Pk/Av**	**Pk/Av**	**Pk/Av**	**Pk/Av**
0.03426	80.6/80.2	Nf	Nf	Nf	Nf	-39.4/-39.8*	56.9/36.9
0.06848	80.2/79.5	Nf	Nf	Nf	Nf	-39.8/-41.5*	50.8/30.8
0.1369			52/48.2	nf	Nf	-28/-31.8	44.8/24.8
0.2047			50/44.9	nf	Nf	-30/-35.1	41.3/21.3

Radiated Emissions 30 - 1000 MHz
FCC 15.225(d), IC RSS-210 A2.6

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 8.3
Minimum margin of compliance for spurious emissions is 1.26 dB at 122.046 MHz, 42.24 dBμV/m at 3 meters

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

Test distance
■ - 3 meters
☐ - 10 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	04-Jun-10
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 23-Oct-10
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	23-Apr-10
WRLE02690	8566B	Hewlett-Packard	Spectrum Analyzer	2430A00930	28-Oct-10
WRLE02674	85662A	Hewlett-Packard	Analyzer Display	2050A02007	28-Oct-10

Cal Code B = Calibration verification performed internally.

Test limits

Frequncy (MHz)	Field strength (μV/m @ 3m)	Field strength (dBμV/m @ 3m)
30 – 88	100	40
88 - 135.6	150	43.5

Within restricted bands of FCC 15.205

Frequncy (MHz)	Field strength (μV/m @ 3m)	Field strength (dBμV/m @ 3m)
135.6 – 216	150	43.5
216 - 960	210	46.4
Above 960	300	49.5

Outside restricted bands of FCC 15.205

Frequncy (MHz)	Field strength (μV/m @ 10m)	Field strength (dBμV/m @ 3m)
135.6 - 216	150	53.5
216 - 960	210	56.4
Above 960	300	59.5

Test data
See following pages

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS			
EUT Model #:	Antenna supplies ID	Date:	4/19/2010			
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0	°C
Test Method:	FCC 15.209			Air Pressure:	99.0	kPa
Customer:	DataCard			Rel. Humidity:	26.0	%
EUT Description:	Antenna supplies ID					
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands					
Data File Name:	3460.dat			Page:	1 of 7	

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 in RBs else class A 3m qp	DELTA2
Begin scan 30 – 1000 MHz						
40.68 MHz	44.9 Qp	0.45 / 16.66 / 29.69 / 0.0	32.32	V / 1.00 / 0	-7.68	n/a
67.8 MHz	46.15 Qp	0.64 / 9.66 / 29.66 / 0.0	26.79	V / 1.00 / 0	-13.21	n/a
94.92 MHz	45.1 Qp	0.86 / 8.42 / 29.63 / 0.0	24.75	V / 1.00 / 0	-18.75	n/a
108.486 MHz	52.8 Qp	0.93 / 9.44 / 29.62 / 0.0	33.55	V / 1.00 / 0	-9.95	n/a
122.046 MHz	61.65 Qp	0.99 / 9.21 / 29.61 / 0.0	42.24	V / 1.00 / 0	-1.26	n/a
135.606 MHz	53.85 Qp	1.04 / 8.38 / 29.59 / 0.0	33.68	V / 1.00 / 0	-9.82	n/a
149.166 MHz	58.85 Qp	1.1 / 9.38 / 29.58 / 0.0	39.75	V / 1.00 / 0	-13.75	n/a
162.726 MHz	54.35 Qp	1.15 / 8.96 / 29.56 / 0.0	34.89	V / 1.00 / 0	-8.61	n/a
176.298 MHz	57.75 Qp	1.21 / 9.73 / 29.55 / 0.0	39.14	V / 1.00 / 0	-14.36	n/a
189.858 MHz	39.8 Qp	1.26 / 10.51 / 29.54 / 0.0	22.03	V / 1.00 / 0	-31.47	n/a
203.424 MHz	59.85 Qp	1.31 / 10.55 / 29.52 / 0.0	42.19	V / 1.00 / 0	-11.31	n/a
216.984 MHz	43.05 Qp	1.35 / 10.8 / 29.51 / 0.0	25.69	V / 1.00 / 0	-27.81	n/a
230.544 MHz	56.9 Qp	1.39 / 11.23 / 29.54 / 0.0	39.98	V / 1.00 / 0	-13.52	n/a
244.104 MHz	38.75 Qp	1.43 / 11.89 / 29.58 / 0.0	22.48	V / 1.00 / 0	-23.52	n/a
257.664 MHz	47.35 Qp	1.47 / 12.54 / 29.54 / 0.0	31.83	V / 1.00 / 0	-14.17	n/a
271.224 MHz	34.2 Qp	1.51 / 12.73 / 29.49 / 0.0	18.96	V / 1.00 / 0	-27.04	n/a
284.784 MHz	52.05 Qp	1.55 / 12.7 / 29.44 / 0.0	36.87	V / 1.00 / 0	-9.13	n/a
311.904 MHz	46.4 Qp	1.64 / 13.86 / 29.44 / 0.0	32.45	V / 1.00 / 0	-23.95	n/a
339.024 MHz	42.2 Qp	1.72 / 14.63 / 29.5 / 0.0	29.04	V / 1.00 / 0	-27.36	n/a
352.59 MHz	37.3 Qp	1.76 / 15.13 / 29.45 / 0.0	24.74	V / 1.00 / 0	-31.66	n/a
420.39 MHz	35.45 Qp	1.95 / 16.72 / 29.48 / 0.0	24.63	V / 1.00 / 0	-31.77	n/a
461.07 MHz	38.35 Qp	2.05 / 16.73 / 29.32 / 0.0	27.81	V / 1.00 / 0	-28.59	n/a
488.19 MHz	39.85 Qp	2.12 / 17.51 / 29.36 / 0.0	30.12	V / 1.00 / 0	-26.28	n/a
515.31 MHz	32.95 Qp	2.19 / 18.08 / 29.4 / 0.0	23.82	V / 1.00 / 0	-32.58	n/a
40.692 MHz	46.45 Qp	0.45 / 16.65 / 29.69 / 0.0	33.87	V / 1.00 / 0	-6.13	n/a
51.242 MHz	45.11 Qp	0.51 / 13.54 / 29.68 / 0.0	29.48	V / 1.00 / 0	-10.52	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS		
EUT Model #:	Antenna supplies ID	Date:	4/19/2010		
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0 °C
Test Method:	FCC 15.209			Air Pressure:	99.0 kPa
Customer:	DataCard			Rel. Humidity:	26.0 %
EUT Description:	Antenna supplies ID				
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands				
Data File Name:	3460.dat			Page:	2 of 7

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 in RBs else class A 3m qp	DELTA2
81.369 MHz	45.0 Qp	0.75 / 7.43 / 29.65 / 0.0	23.53	V / 1.00 / 0	-16.47	n/a
103.149 MHz	50.75 Qp	0.91 / 9.23 / 29.62 / 0.0	31.26	V / 1.00 / 0	-12.24	n/a
115.379 MHz	47.8 Qp	0.96 / 9.67 / 29.61 / 0.0	28.82	V / 1.00 / 0	-14.68	n/a
284.79 MHz	51.85 Qp	1.55 / 12.7 / 29.44 / 0.0	36.67	V / 1.00 / 0	-9.33	n/a
461.07 MHz	38.85 Qp	2.05 / 16.73 / 29.32 / 0.0	28.31	V / 1.00 / 90	-28.09	n/a
515.31 MHz	33.9 Qp	2.19 / 18.08 / 29.4 / 0.0	24.77	V / 1.00 / 90	-31.63	n/a
67.8 MHz	46.9 Qp	0.64 / 9.66 / 29.66 / 0.0	27.54	V / 1.00 / 90	-12.46	n/a
189.858 MHz	40.7 Qp	1.26 / 10.51 / 29.54 / 0.0	22.93	V / 1.00 / 90	-30.57	n/a
40.692 MHz	47.7 Qp	0.45 / 16.65 / 29.69 / 0.0	35.12	V / 1.00 / 180	-4.88	n/a
81.369 MHz	46.95 Qp	0.75 / 7.43 / 29.65 / 0.0	25.48	V / 1.00 / 180	-14.52	n/a
189.858 MHz	50.55 Qp	1.26 / 10.51 / 29.54 / 0.0	32.78	V / 1.00 / 180	-20.72	n/a
67.8 MHz	48.8 Qp	0.64 / 9.66 / 29.66 / 0.0	29.44	V / 1.00 / 270	-10.56	n/a
203.418 MHz	60.55 Qp	1.31 / 10.55 / 29.52 / 0.0	42.89	H / 1.00 / 270	-10.61	n/a
216.984 MHz	44.3 Qp	1.35 / 10.8 / 29.51 / 0.0	26.94	H / 1.00 / 270	-26.56	n/a
230.544 MHz	58.8 Qp	1.39 / 11.23 / 29.54 / 0.0	41.88	H / 1.00 / 270	-11.62	n/a
244.104 MHz	41.15 Qp	1.43 / 11.89 / 29.58 / 0.0	24.88	H / 1.00 / 270	-21.12	n/a
271.224 MHz	39.7 Qp	1.51 / 12.73 / 29.49 / 0.0	24.46	H / 1.00 / 270	-21.54	n/a
284.784 MHz	57.9 Qp	1.55 / 12.7 / 29.44 / 0.0	42.72	H / 1.00 / 270	-3.28	n/a
420.39 MHz	36.0 Qp	1.95 / 16.72 / 29.48 / 0.0	25.18	H / 1.00 / 270	-31.22	n/a
461.07 MHz	40.95 Qp	2.05 / 16.73 / 29.32 / 0.0	30.41	H / 1.00 / 270	-25.99	n/a
488.19 MHz	40.9 Qp	2.12 / 17.51 / 29.36 / 0.0	31.17	H / 1.00 / 270	-25.23	n/a
257.664 MHz	48.95 Qp	1.47 / 12.54 / 29.54 / 0.0	33.43	H / 1.00 / 180	-12.57	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS		
EUT Model #:	Antenna supplies ID	Date:	4/19/2010		
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0 °C
Test Method:	FCC 15.209			Air Pressure:	99.0 kPa
Customer:	DataCard			Rel. Humidity:	26.0 %
EUT Description:	Antenna supplies ID				
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands				
Data File Name:	3460.dat			Page:	3 of 7

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 in RBs else class A 3m qp	DELTA2
257.664 MHz	51.7 Qp	1.47 / 12.54 / 29.54 / 0.0	36.18	H / 1.00 / 90	-9.82	n/a
488.19 MHz	42.1 Qp	2.12 / 17.51 / 29.36 / 0.0	32.37	H / 1.00 / 90	-24.03	n/a
420.39 MHz	36.45 Qp	1.95 / 16.72 / 29.48 / 0.0	25.63	H / 2.00 / 0	-30.77	n/a
420.39 MHz	37.7 Qp	1.95 / 16.72 / 29.48 / 0.0	26.88	H / 2.00 / 270	-29.52	n/a
461.07 MHz	42.1 Qp	2.05 / 16.73 / 29.32 / 0.0	31.56	H / 2.00 / 270	-24.84	n/a
488.19 MHz	42.75 Qp	2.12 / 17.51 / 29.36 / 0.0	33.02	H / 2.00 / 270	-23.38	n/a
230.544 MHz	59.95 Qp	1.39 / 11.23 / 29.54 / 0.0	43.03	V / 2.00 / 0	-10.47	n/a
94.92 MHz	46.2 Qp	0.86 / 8.42 / 29.63 / 0.0	25.85	V / 2.00 / 180	-17.65	n/a
maximized						
122.046 MHz	61.57 Qp	0.99 / 9.21 / 29.61 / 0.0	42.16	V / 2.00 / 15	-1.34	n/a
284.784 MHz	57.32 Qp	1.55 / 12.7 / 29.44 / 0.0	42.14	H / 1.07 / 277	-3.86	n/a
40.692 MHz	49.45 Qp	0.45 / 16.65 / 29.69 / 0.0	36.87	V / 1.00 / 0	-3.13	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS		
EUT Model #:	Antenna supplies ID	Date:	4/19/2010		
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0 °C
Test Method:	FCC 15.209			Air Pressure:	99.0 kPa
Customer:	DataCard			Rel. Humidity:	26.0 %
EUT Description:	Antenna supplies ID				
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands				
Data File Name:	3460.dat			Page:	4 of 7

Measurement summary for limit1: FCC 15.209 in restricted bands, else class A. 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 in RBs else class A 3m qp
122.046 MHz	61.65 Qp	0.99 / 9.21 / 29.61 / 0.0	42.24	V / 1.00 / 0	-1.26
40.692 MHz	49.45 Qp	0.45 / 16.65 / 29.69 / 0.0	36.87	V / 1.00 / 0	-3.13
284.784 MHz	57.9 Qp	1.55 / 12.7 / 29.44 / 0.0	42.72	H / 1.00 / 270	-3.28
162.726 MHz	54.35 Qp	1.15 / 8.96 / 29.56 / 0.0	34.89	V / 1.00 / 0	-8.61
135.606 MHz	53.85 Qp	1.04 / 8.38 / 29.59 / 0.0	33.68	V / 1.00 / 0	-9.82
257.664 MHz	51.7 Qp	1.47 / 12.54 / 29.54 / 0.0	36.18	H / 1.00 / 90	-9.82
108.486 MHz	52.8 Qp	0.93 / 9.44 / 29.62 / 0.0	33.55	V / 1.00 / 0	-9.95
230.544 MHz	59.95 Qp	1.39 / 11.23 / 29.54 / 0.0	43.03	V / 2.00 / 0	-10.47
51.242 MHz	45.11 Qp	0.51 / 13.54 / 29.68 / 0.0	29.48	V / 1.00 / 0	-10.52
67.8 MHz	48.8 Qp	0.64 / 9.66 / 29.66 / 0.0	29.44	V / 1.00 / 270	-10.56
203.418 MHz	60.55 Qp	1.31 / 10.55 / 29.52 / 0.0	42.89	H / 1.00 / 270	-10.61
103.149 MHz	50.75 Qp	0.91 / 9.23 / 29.62 / 0.0	31.26	V / 1.00 / 0	-12.24
149.166 MHz	58.85 Qp	1.1 / 9.38 / 29.58 / 0.0	39.75	V / 1.00 / 0	-13.75
176.298 MHz	57.75 Qp	1.21 / 9.73 / 29.55 / 0.0	39.14	V / 1.00 / 0	-14.36
81.369 MHz	46.95 Qp	0.75 / 7.43 / 29.65 / 0.0	25.48	V / 1.00 / 180	-14.52
115.379 MHz	47.8 Qp	0.96 / 9.67 / 29.61 / 0.0	28.82	V / 1.00 / 0	-14.68
94.92 MHz	46.2 Qp	0.86 / 8.42 / 29.63 / 0.0	25.85	V / 2.00 / 180	-17.65
189.858 MHz	50.55 Qp	1.26 / 10.51 / 29.54 / 0.0	32.78	V / 1.00 / 180	-20.72
244.104 MHz	41.15 Qp	1.43 / 11.89 / 29.58 / 0.0	24.88	H / 1.00 / 270	-21.12
271.224 MHz	39.7 Qp	1.51 / 12.73 / 29.49 / 0.0	24.46	H / 1.00 / 270	-21.54
488.19 MHz	42.75 Qp	2.12 / 17.51 / 29.36 / 0.0	33.02	H / 2.00 / 270	-23.38
311.904 MHz	46.4 Qp	1.64 / 13.86 / 29.44 / 0.0	32.45	V / 1.00 / 0	-23.95
461.07 MHz	42.1 Qp	2.05 / 16.73 / 29.32 / 0.0	31.56	H / 2.00 / 270	-24.84
216.984 MHz	44.3 Qp	1.35 / 10.8 / 29.51 / 0.0	26.94	H / 1.00 / 270	-26.56
339.024 MHz	42.2 Qp	1.72 / 14.63 / 29.5 / 0.0	29.04	V / 1.00 / 0	-27.36

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS			
EUT Model #:	Antenna supplies ID	Date:	4/19/2010			
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0	°C
Test Method:	FCC 15.209			Air Pressure:	99.0	kPa
Customer:	DataCard			Rel. Humidity:	26.0	%
EUT Description:	Antenna supplies ID					
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands					
Data File Name:	3460.dat			Page:	5 of 7	

Measurement summary for limit1: FCC 15.209 in restricted bands, else class A. 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 in RBs else class A 3m qp
420.39 MHz	37.7 Qp	1.95 / 16.72 / 29.48 / 0.0	26.88	H / 2.00 / 270	-29.52
515.31 MHz	33.9 Qp	2.19 / 18.08 / 29.4 / 0.0	24.77	V / 1.00 / 90	-31.63
352.59 MHz	37.3 Qp	1.76 / 15.13 / 29.45 / 0.0	24.74	V / 1.00 / 0	-31.66

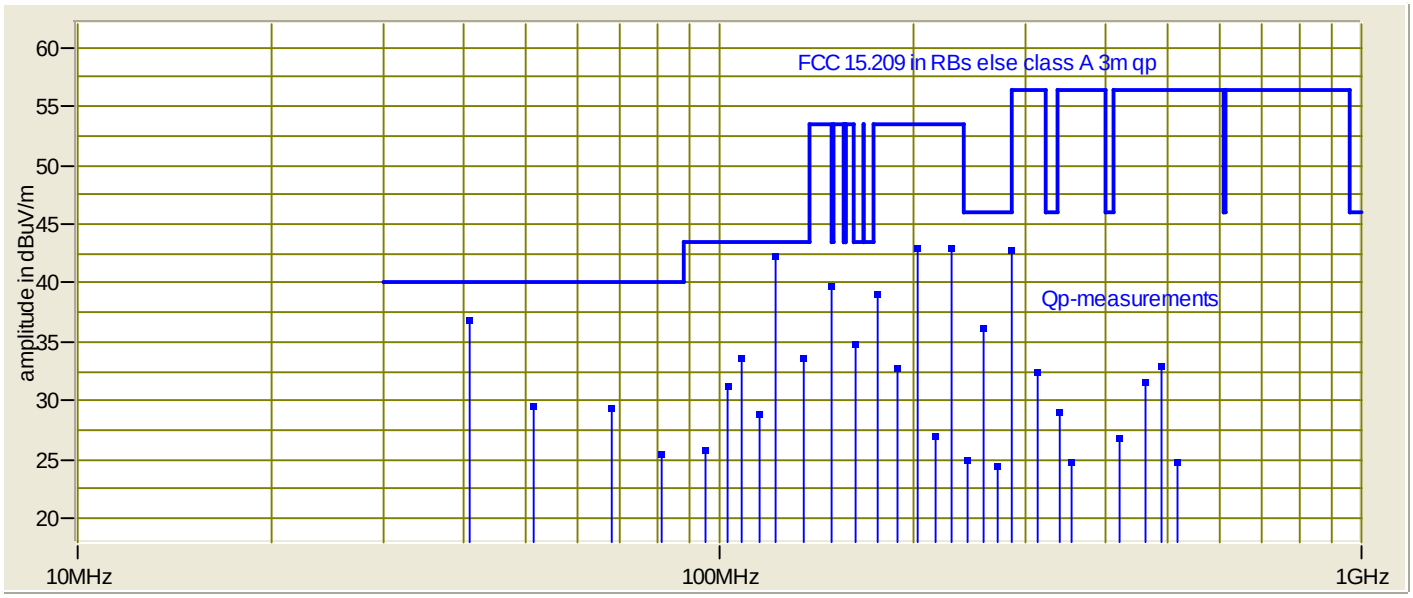
Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS		
EUT Model #:	Antenna supplies ID	Date:	4/19/2010		
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0 °C
Test Method:	FCC 15.209			Air Pressure:	99.0 kPa
Customer:	DataCard			Rel. Humidity:	26.0 %
EUT Description:	Antenna supplies ID				
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands				
Data File Name:	3460.dat			Page:	6 of 7

Graph:



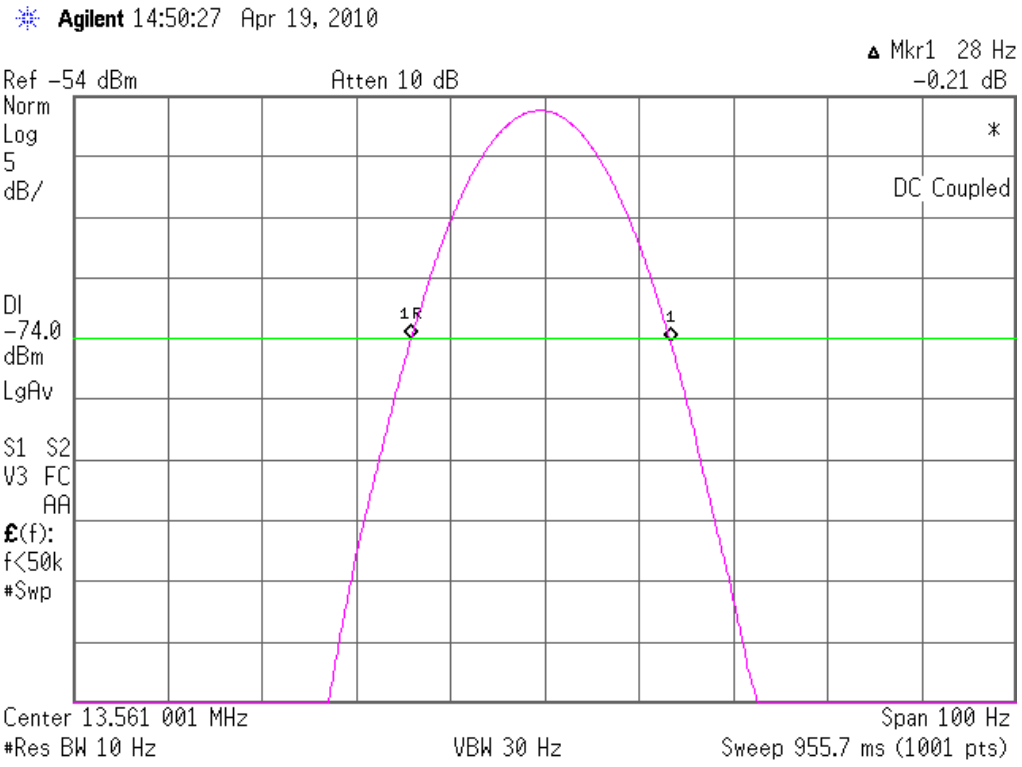
Tested by: Greg Jakubowski (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

RADIATED EMISSIONS

Test Report #:	WC1003460 Run 1	Test Area:	LTS		
EUT Model #:	Antenna supplies ID	Date:	4/19/2010		
EUT Serial #:	19811021000018	EUT Power:	110V / 60Hz	Temperature:	20.0 °C
Test Method:	FCC 15.209			Air Pressure:	99.0 kPa
Customer:	DataCard			Rel. Humidity:	26.0 %
EUT Description:	Antenna supplies ID				
Notes:	15.209 limits from 30 to 135.6 MHz and in restricted bands. Class A limits outside restricted bands				
Data File Name:	3460.dat			Page:	7 of 7

Occupied Bandwidth per IC RSS-Gen Issue 2, 4.6.1
Unmodulated CW carrier
Reference level = maximum level with 100kHz RBW



Tested by: Greg Jakubowski (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

Frequency Stability
FCC 15.225(e), IC RSS-210 A2.6

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 13.1.6

Test location
■ - New Brighton Environmental Lab
☐ - Wild River Lab Small Test Site (Open Area Test Site)

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
NBLE02721	79-II	Fluke	Digital Multimeter	64510250	03-Feb-11
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10
NBLE10517	3PN1520B	Staco	Variable Transformer 240V 9	0807	Code Y
NBLE02435	LP-105A	Singer	Magnetic Field Probe	1	Code Y
NBLE02241	SM-8C MiniMax	Thermotron	8 Cu Ft Temperature/Humidity Chamber	11754-S	06-Aug-10

Cal Code B = Calibration verification performed internally.

Test limits
±0.01%

Test data

Temperature	Frequency	Limit		Deviation
-20 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
-10 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
0 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
10 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
20 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
30 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
40 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
50 degrees C	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
85% input voltage	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%
115% input voltage	13.5610 MHz	±0.01%	±1.356 kHz	less than ±0.01%

Occupied bandwidth
RSS-Gen 4.6.1

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Test was performed in accordance with the article “The Measurement of Occupied Bandwidth” by Industry Canada’s certification bureau.
Occupied bandwidth = 28 Hz

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

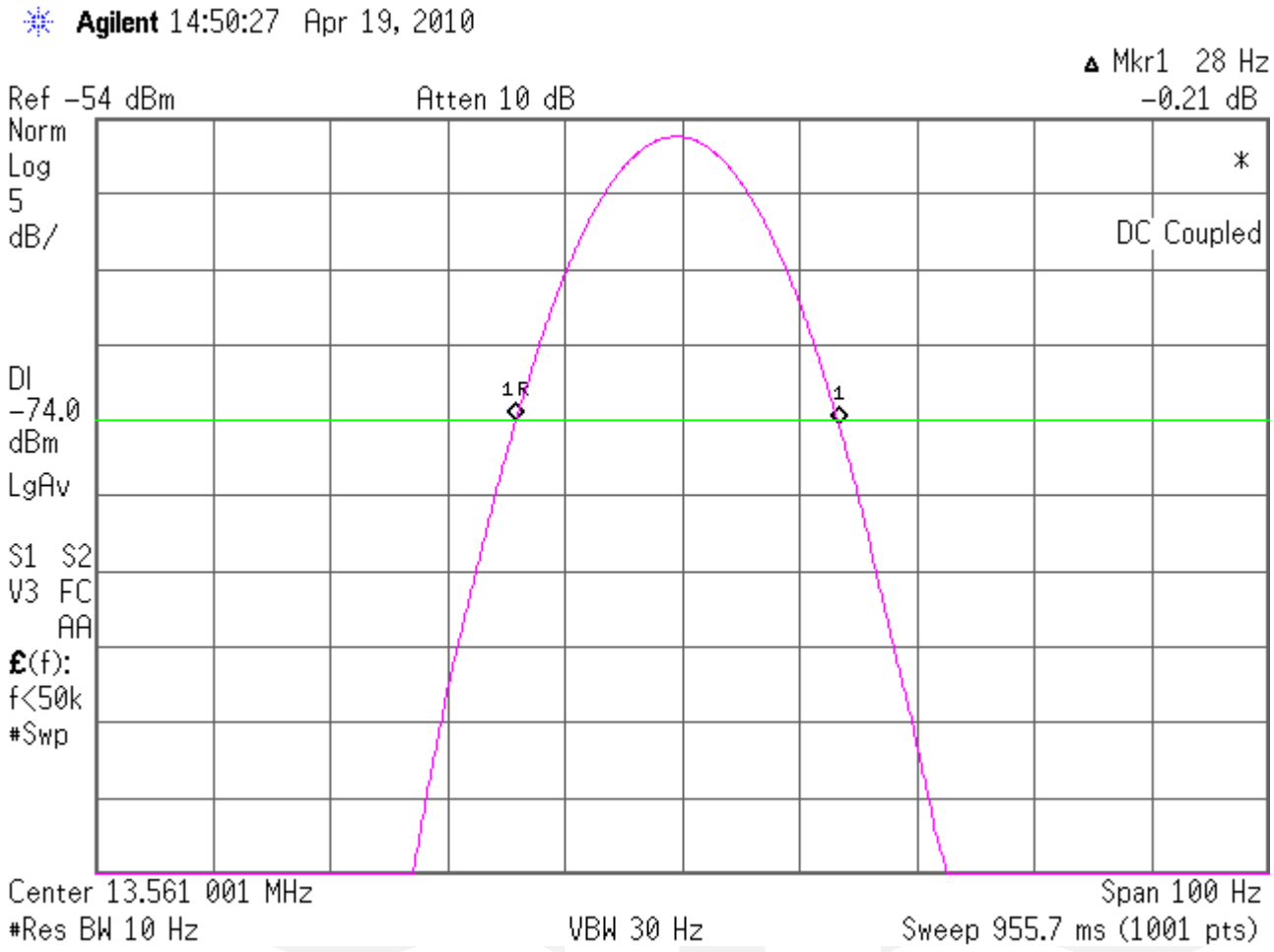
Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE02517	HFH2-Z2	Polarad	Loop Antenna	879285/036	01-Jul-10
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

Test limit
No limit specified

Test data
See following page


Agilent 14:50:27 Apr 19, 2010
Mkr1 28 Hz
Ref -54 dBm
Atten 10 dB
-0.21 dB
Norm
Log
5
dB/
DC Coupled
Dl
-74.0
dBm
LgAv
S1 S2
V3 FC
AA
£(f):
f<50k
#Swp
1R
1
Center 13.561 001 MHz
Span 100 Hz
#Res BW 10 Hz
VBW 30 Hz
Sweep 955.7 ms (1001 pts)

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.

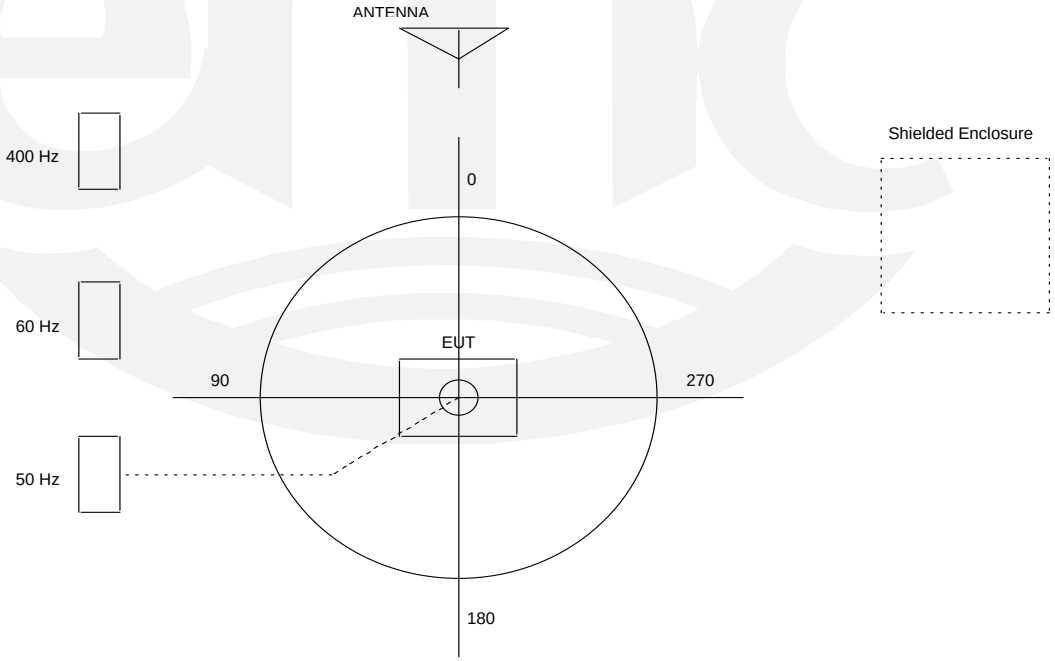
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.

3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.

4. The circle is a 6.7 meter diameter turntable.

5. A ground plane is in the plane of this sheet.

6. The test sample is shown in the azimuthal position representing zero degrees.



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

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

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

■ - Normal operating mode

Configuration of the device under test:

■ - See Appendix A and test setup photos

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

DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

Conducted emissions on the AC power supply were not tested because it is not representative of future device applications. This testing is being done for Class II permissive change on limited modular device, conducted emission compliance has been established, and will continue to be monitored by Datacard on products using the module.

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:	19 April 2010
Condition of EUT:	Normal
Testing Start Date:	19 April 2010
Testing End Date:	19 April 2010

TÜV SÜD AMERICA INC

Tested by:

Greg Jakubowski
EMC Test Engineer

Approved by:

Joel T Schneider
Senior EMC Engineer

Appendix A

EMC Test Plan / Constructional Data Form and Block Diagram

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: Datacard Group

Address: 11111 Bren Rd W
Minnetonka, MN 55343

Contact: Dale Hallstrom Position: Sr Principal Engineer

Phone: 952-988-1913 Fax:

E-mail Address: dale_hallstrom@datacard.com

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

EUT Description: RFID Reader

EUT Name: 534508-001, PWA, Antenna, Supplies ID, Gen 3

Model No.: Serial No.: 19811021000018

Product Options:

Configurations to be tested:

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:

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

- ☐ EMC Directive 2004/108/EC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC) Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive: ☐ 2001/3/EC (EMC) ☐ 2004/104/EC (EMC) ☐ Other Vehicle Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)
- ☒ FCC: Class ☐ A ☐ B Part 15
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B (Separate Report)
- ☒ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☒ Other: EN 300 330

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

- ☐ Attestation of Conformity (AoC)*
- ☐ Certificate of Conformity (CoC)*
- ☐ EMC Certification (used with Octagon Mark)*
- ☐ Compliance Document*
- Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III
  (Press **F1** when field is selected to show additional information on Protection Class.)
- ☐ FCC / TCB Certification
- ☐ E-Mark Certification
- ☐ Industry Canada / FCB Certification
- ☐ Taiwan Certification

EMC Test Plan and Constructional Data Form

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: _____ Width: _____ Height: _____ Weight: _____

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: 90 - 264 VAC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: 1

Current (Amps/phase(max)): 1 amp Current (Amps/phase(nominal)): 300 ma

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

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

Office machines, Industrial machines

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 1

☒ Shielded OR ☐ Unshielded

☐ Not Applicable

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables

Type	Analog	Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level:

Description:

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 Product Service Representative if additional assistance is required.

1. Reading RFID Tag

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 #
Antenna, Supplies ID, Gen 3	PWA 534508-001	19811021000018	

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.

Description	*Model #*	*Serial #*	*FCC ID #*

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
	8 MHZ			Clock for processor
	13.56 MHZ			clock for RFID antenna driver

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
Skynet Electronics	SNP Q316		☐ Switched-mode: (Frequency) _____ ☐ Linear ☒ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*

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

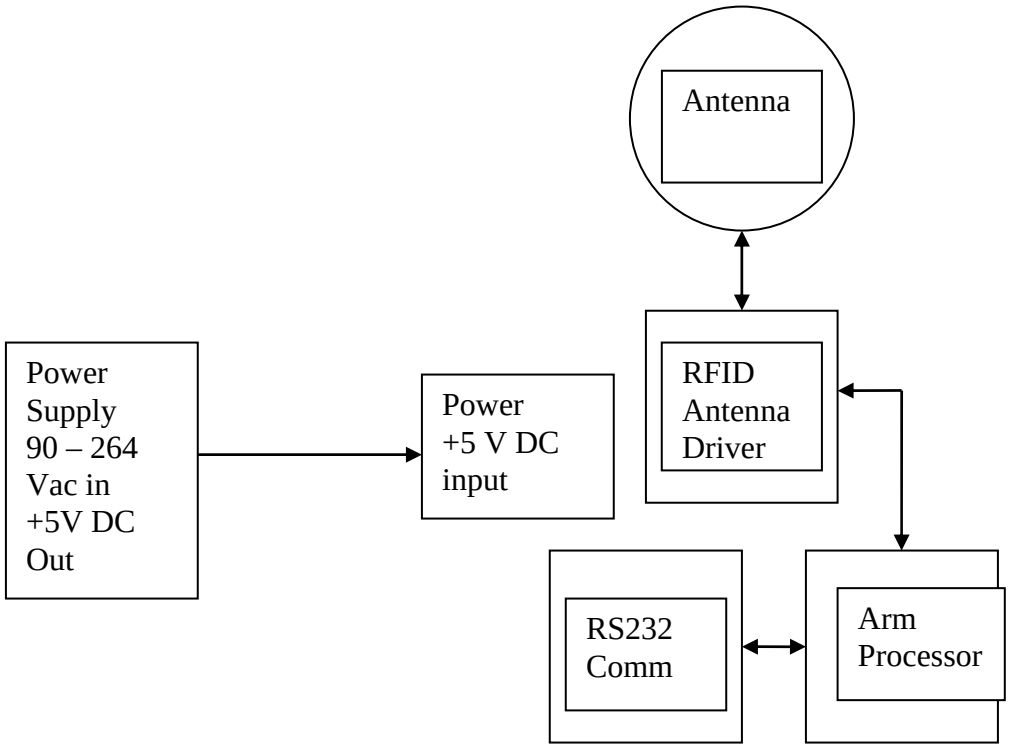
PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

Authorization (Signature Required if a Third Party Certification is checked on pg 1)

Customer authorization to perform tests according to this test plan.	Date
Dale Hallstrom	4/19/2010
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

Customer authorization to perform tests according to this test plan.	Date
Dale Hallstrom	4/19/2010
Test Plan/CDF Prepared By (please print)	Date

Appendix B

Measurement Protocol

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Emissions testing is performed according to the procedures in ANSI C63.4-2003 & the article “The Measurement of Occupied Bandwidth” by Industry Canada’s certification bureau

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 dBμV, equals the EMI receiver level plus the cable loss and LISN factor.

Radiated Emissions

The final level, in dBμV/m, equals the reading from the spectrum analyzer (Level dBμV), 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.

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE/ANT/PREAMP (dB)	(dB/m)	(dB)	FINAL (dBuV/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.

DETAILS OF TEST PROCEDURES

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions.

Radiated Emissions

Radiated emissions in the frequency range of 10kHz to 30 MHz, including the fundamental transmit signal, are measured using a receiver capable of quasi-peak, average, and peak measurements and a magnetic loop antenna. The transmitter is rotated through 3 orthogonal axes in order to determine the maximum emission levels. If the signal cannot be measured at the specified limit distance, measurements are recorded at multiple distances nearer to the device and the final level mathematically extrapolated. 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 and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Floor standing equipment is placed directly on the turntable/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. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. 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.