

TEST REPORT

FCC Part 15 Subpart C Section 15.209

IC RSS-210 Issue 8

IC RSS-Gen Issue 3

MANUFACTURER'S NAME	Datacard Group 11111 Bren Road West Minnetonka MN 55343
PRODUCT NAME	Datacard Coupler
MODEL NUMBER(S) TESTED	505430
SERIAL NUMBER(S) TESTED	n/a
PRODUCT DESCRIPTION	13.56 MHz RFID module
TEST REPORT NUMBER	WC1203098
TEST DATE(S)	20 March - 18 April 2012

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 15.209 "Radiated emission limits; general requirements" and Industry Canada RSS-210 Issue 8 "Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment" and Industry Canada RSS-Gen Issue 3 "General Requirements and Information for the Certification of Radio Apparatus".

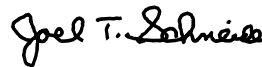
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production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

Date: 01 June 2012

Location: Taylors Falls MN
USA



Greg Jakubowski
Senior EMC Technician



Joel T Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No. WC1203098 Date of issue: 01 June 2012

Product Name Datacard Coupler

Model(s) Tested 505430

Serial No(s) Tested n/a

Product Description 13.56 MHz RFID module

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.

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 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
	25	01 June 2012	Initial Release



DIRECTORY

Contents

Revision Record		<u>2</u>
Directory		<u>3</u>
Test Regulations		<u>4</u>
Environmental Conditions		<u>4</u>
Power Supply		<u>4</u>
Test Equipment Traceability		<u>4</u>
Test Information		
General Field Strength Limits 0.009 – 30 MHz	FCC 15.209(a), (c), IC RSS-210 2.5, RSS-GEN 7.2.5	<u>5 - 6</u>
Radiated Emissions 30 - 1000 MHz	15.209(c) & (f) , IC RSS-210 2.5	<u>7 - 8</u>
Occupied Bandwidth	RSS-Gen 4.6.1	<u>9 - 11</u>
Test area diagram		<u>12</u>
Test-setup Photos		<u>13 - 15</u>
Equipment Under Test Information		<u>16</u>
General Remarks, Deviations, Summary		<u>17</u>
Appendix A		
EMC Test Plan and Constructional Data Form		<u>18 - 25</u>

EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C Section 15.209 Paragraphs (a), (c), (f)

IC RSS-210 Issue 8 Section 2.5

IC RSS-Gen Issue 3 Sections 4.6.1, 7.2.5

ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 21-23°C
Atmospheric pressure	: 98.5-99kPa
Relative Humidity	: 25-30%

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.

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. 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

General field strength limits 0.009 – 30 MHz

FCC 15.209(a), FCC 15.209(c), IC RSS-210 2.5, RSS-Gen 7.2.5

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.

Maximum field strength of the fundamental is 29 dB μ V/m or 28.1 μ V/m at 30 meters at 13.56 MHz.

Minimum margin of compliance of the fundamental is 0.5 dB.

Maximum field strength of spurious emissions is -31.7 dB μ V/m or 0.026 μ V/m at 30 meters at 27.12 MHz. Minimum margin of compliance of the spurious emission is 61.2 dB.

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 meter

☒ - 1 meters

☒ - 3 meters

☒ - 10 meter

☒ - 30 meters

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	837055/003	15-Jun-12
WRLE02517	HFH2-Z2	Polorad	Loop Antenna	879285/036	18-Aug-12

Test limit

Frequency (MHz)	Field strength μ V/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

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.

Test Data

See following page

Determined using 40 dB / decade roll off

Rev. 113006

Radiated Emissions 30 - 1000 MHz

FCC 15.209(c), FCC 15.209(f), IC RSS-210 2.5, RSS-Gen 7.2.5

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.

Maximum spurious emission is 38.93 dB μ V/m (88.4 μ V/m) at 3 meters at 149.17 MHz. Minimum margin of compliance is 4.57 dB.

Test location

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

Test distance

3 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03995	EM-6917B	Electro-Metrics	Biconicalog Periodic	151	06-May-12
WRLE02674	85662A	Hewlett-Packard	Analyzer Display	2050A02007	07-Dec-12
WRLE02690	8568B	Hewlett-Packard	Spectrum Analyzer	2430A00930	07-Dec-12
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	24-May-12
WRLE02670	8447D	Hewlett-Packard	Preamplifier	2443A03954	Code B 06-Feb-13

Cal Code B = Calibration verification performed internally.

Limit

Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The emission limits shown in the above tables 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. 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 a 120 kHz / 6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz RBW/VBW / 6 dB bandwidth and peak detection, 1 MHz RBW/ 10 Hz VBW for average detection. Table top equipment is placed on a non-conductive support 80 cm 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. 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 is rotated 360 degrees. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB / decade (inverse linear-distance for field strength measurements).

Test data

See next page.

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
149.17 MHz	56.7 Qp	1.1 / 8.64 / 27.5 / 0.0	38.93	V / 1.00 / 90	-4.57
325.463 MHz	53.85 Qp	1.68 / 13.02 / 27.23 / 0.0	41.31	H / 1.00 / 0	-4.69
162.731 MHz	53.95 Qp	1.15 / 8.24 / 27.46 / 0.0	35.88	V / 1.00 / 0	-7.62
52.58 MHz	45.68 Qp	0.52 / 12.33 / 27.52 / 0.0	31.02	V / 1.00 / 0	-8.98
122.054 MHz	52.98 Qp	0.99 / 7.72 / 27.44 / 0.0	34.25	V / 1.00 / 3	-9.25
176.292 MHz	51.5 Qp	1.21 / 8.91 / 27.41 / 0.0	34.21	V / 1.00 / 0	-9.29
135.596 MHz	52.6 Qp	1.04 / 7.62 / 27.42 / 0.0	33.85	V / 1.00 / 0	-9.65
840.781 MHz	37.8 Qp	2.97 / 21.72 / 26.45 / 0.0	36.05	H / 1.00 / 0	-9.95
94.926 MHz	50.45 Qp	0.86 / 7.41 / 27.53 / 0.0	31.2	V / 1.00 / 90	-12.3
298.341 MHz	46.0 Qp	1.6 / 12.12 / 27.29 / 0.0	32.42	H / 1.00 / 0	-13.58
144.364 MHz	47.75 Qp	1.08 / 8.28 / 27.47 / 0.0	29.63	V / 1.00 / 90	-13.87
189.853 MHz	45.1 Qp	1.26 / 9.59 / 27.37 / 0.0	28.58	V / 1.00 / 0	-14.92
203.414 MHz	44.45 Qp	1.31 / 10.07 / 27.33 / 0.0	28.5	H / 2.00 / 180	-15.0
67.814 MHz	42.7 Qp	0.64 / 9.19 / 27.58 / 0.0	24.96	V / 1.00 / 90	-15.04
150.0 MHz	46.1 Qp	1.1 / 8.7 / 27.5 / 0.0	28.4	V / 1.00 / 90	-15.1
198.318 MHz	44.25 Qp	1.29 / 10.02 / 27.35 / 0.0	28.21	V / 1.00 / 90	-15.29
569.561 MHz	36.55 Qp	2.32 / 18.31 / 27.17 / 0.0	30.01	H / 1.00 / 90	-15.99
71.738 MHz	40.56 Qp	0.67 / 8.49 / 27.59 / 0.0	22.13	V / 1.00 / 0	-17.87
311.902 MHz	39.35 Qp	1.64 / 13.0 / 27.26 / 0.0	26.72	H / 1.00 / 0	-19.28
271.219 MHz	40.35 Qp	1.51 / 11.95 / 27.35 / 0.0	26.46	H / 1.00 / 0	-19.54
230.536 MHz	41.45 Qp	1.39 / 10.65 / 27.35 / 0.0	26.14	H / 2.00 / 180	-19.86
257.658 MHz	39.05 Qp	1.47 / 11.51 / 27.38 / 0.0	24.65	H / 1.00 / 0	-21.35
108.487 MHz	40.3 Qp	0.93 / 8.39 / 27.48 / 0.0	22.14	V / 1.00 / 0	-21.36
244.097 MHz	36.85 Qp	1.43 / 11.08 / 27.39 / 0.0	21.98	H / 2.00 / 180	-24.02
216.975 MHz	34.05 Qp	1.35 / 10.22 / 27.31 / 0.0	18.31	H / 2.00 / 0	-27.69

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
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	17 May 13
NBLE02435	LP-105A	SG	Magnetic Field Probe	1	Code Y

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

Test limit

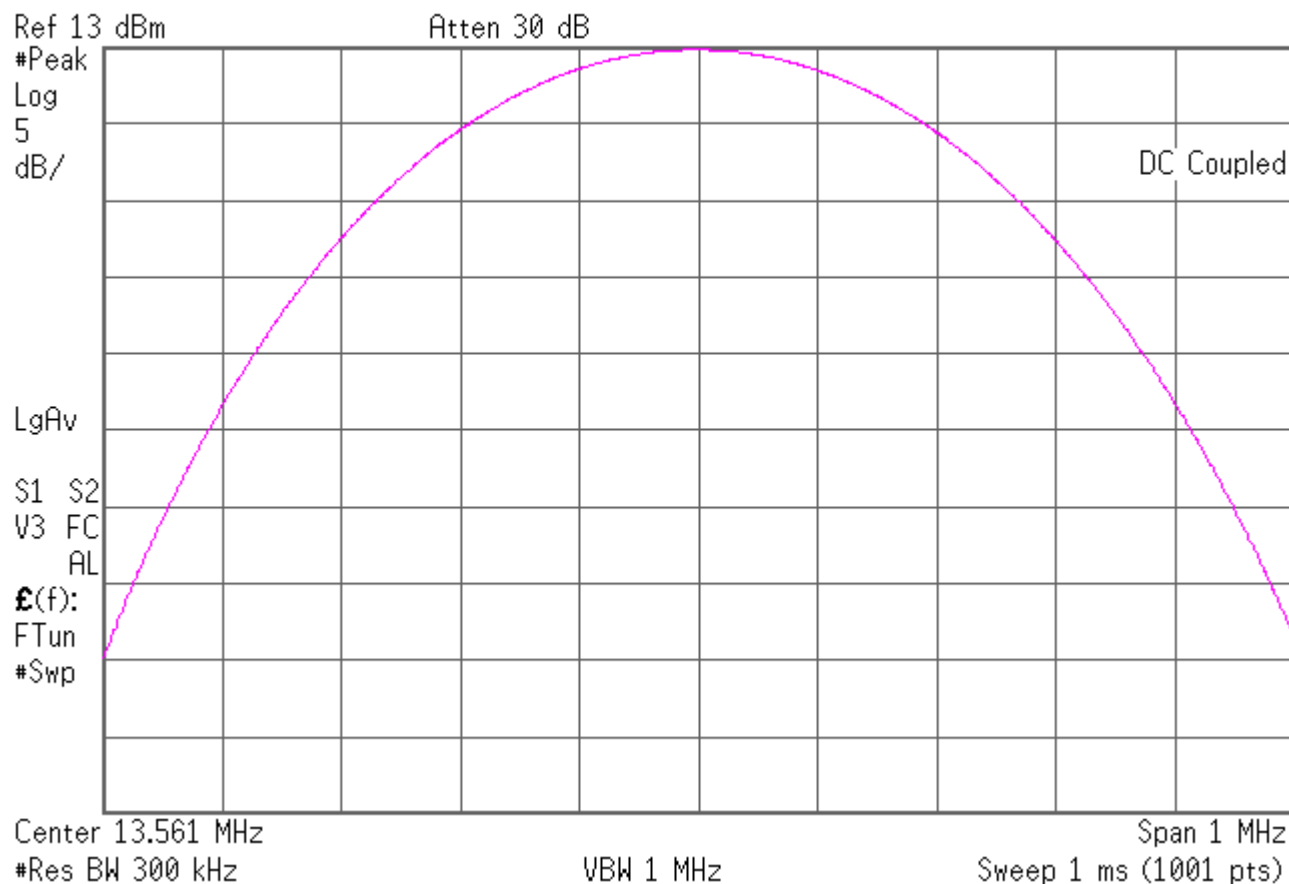
Not specified

Test data

See following pages

99% Occupied bandwidth
1 of 2

Agilent 10:07:51 Apr 18, 2012



99% Occupied bandwidth
2 of 2

Agilent 10:09:49 Apr 18, 2012

▲ Mkr1 28 Hz
0.12 dB

Ref 13 dBm

Atten 30 dB

#Peak
Log
5
dB/

DC Coupled

DI
-7.0
dBm
LgAv

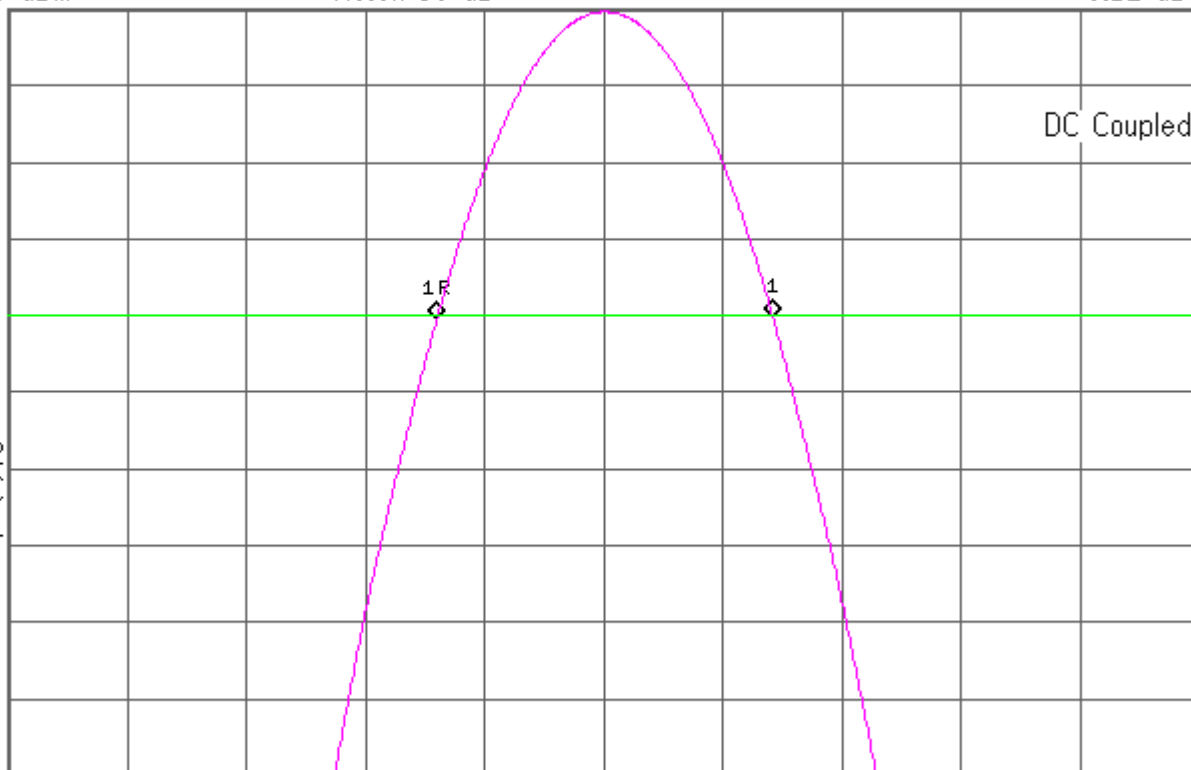
S1 S2
V3 FC
AL

£(f):
f<50k
#Swp

Center 13.560 884 MHz
#Res BW 10 Hz

VBW 30 Hz

Span 100 Hz
Sweep 955.7 ms (1001 pts)



PAGES 13 – 16 REMOVED FOR TEST SET-UP EXHIBIT
TO BE HELD SHORT TERM CONFIDENTIAL

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:

None

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: 20 March 2012

Condition of EUT: Normal

Testing Start Date: 20 March 2012

Testing End Date: 18 April 2012

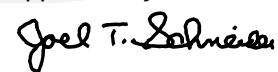
TÜV SÜD AMERICA INC

Tested by:



Greg Jakubowski
Senior EMC Technician

Approved by:



Joel T Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form



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
Address: 11111 Bren Rd W Minnetonka MN 55343

Contact: Mike Greschner Position: Agency Engineer
Phone: 952-988-1840 Fax: _____
E-mail Address: mike_greschner@datacard.com

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

EUT Description Datacard Coupler (Intentional Radiator 505430)
EUT Name _____
Model No.: 505430 Serial No.: _____
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: _____
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: _____ | ☒ FCC: Class ☐ A ☐ B Part <u>15.209</u> |
| ☐ Machinery Directive 89/392/EEC (EMC)
Std: _____ | ☐ VCCI: Class ☐ A ☐ B |
| ☐ Medical Device Directive 93/42/EEC (EMC)
Std: _____ | ☐ BSMI: Class ☐ A ☐ B (Separate Report) |
| | ☐ Canada: Class ☐ A ☐ B |
| | ☐ Australia: Class ☐ A ☐ B |
| | EN 300 330-2 V1.5.1, RSS - 210
Issue 8: 2010: License-exempt Radio
Apparatus (All Frequency Bands):
Category I Equipment, RSS - Gen
Issue 3: 2010: General Requirements
and Information for Certification of
Radio Apparatus |
| ☐ Vehicle Directive - 2004/104/EC (EMC)
☐ Other Vehicle Std: _____ | ☒ Other: _____ |
| ☐ FDA Reviewers Guidance for Premarket
Notification Submissions (EMC) | ☐ Ag Directive *2009/64/EC (EMC) |

Form



EMC Test Plan and Constructional Data Form

Third Party Certification (contact TÜV for quote), if applicable (*Signature on last page required).

☐ Attestation of Compliance (AoC)*	☐ EMC Certification (used with Octagon Mark)*
☐ Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed	
Protection Class (Req'd for AoC, SoC, EMC Cert. 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	☐ Taiwan Certification
☐ Industry Canada / FCB Certification	☐ Korean Certification
☐ e-Mark 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: _____ 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: 24Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

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

EUT Power Cable

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

☐ Shielded OR ☒ Unshielded

☐ Not Applicable

Form



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	☐	☒	☒	☐	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐

Form



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. Full power mode
- 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 #

Form



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>

Oscillator Frequencies

<i>Manufacturer</i>	<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
	13.56Mhz		505430/Barrel Module	Programing cards

Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

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

Form



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)

Mike Greschner

4-10-12

Customer authorization to perform tests
according to this test plan.

Date

Mike Greschner

4-10-12

Test Plan/CDF Prepared By (please print)

Date

SYSTEM BLOCK DIAGRAM FOR SINGLE MODULAR APPROVAL

