

TEST REPORT

FCC Part 15 Subpart C Section 15.209

IC RSS-210 Issue 8

IC RSS-Gen Issue 3

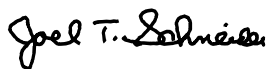
MANUFACTURER'S NAME	RFID Solutions S.L. Severo Ochoa 33/35-Parque Tecnológico Campanillas (Malaga) Spain 29590.
PRODUCT NAME	Radio Frequency Identification Reader -(RFID Reader)
MODEL NUMBER(S) TESTED	M250
SERIAL NUMBER(S) TESTED	n/a
PRODUCT DESCRIPTION	Radio Frequency Identification Reader -(RFID Reader)
TEST REPORT NUMBER	WC1207035
TEST DATE(S)	31 July – 01 August, 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: 22 August 2012

Location: Taylors Falls MN
USA



Joel T Schneider
Senior EMC Engineer



Robert J Behringer
EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No. WC1207035 Date of issue: 22 August 2012

Product Name Radio Frequency Identification Reader -(RFID Reader)

Model(s) Tested M250

Serial No(s) Tested n/a

Product Description Radio Frequency Identification Reader -(RFID Reader)

Manufacturer RFID Solutions S.L.
Severo Ochoa 33/35-Parque Tecnologico
Campanillas (Malaga)
Spain 29590.

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	22 August 2012	Initial Release



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EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C §15.209

IC RSS-210 Issue 8

IC RSS-Gen Issue 3

ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 20-21°C
Atmospheric pressure	: 99kPa
Relative Humidity	: 50-87%

POWER SUPPLY UTILIZED

Power supply system : 3 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 2009, clause 8.2.2.

Maximum field strength of the fundamental is 1 dB μ V/m or 1.122 μ V/m at 300 meters at 134.2 kHz.

Minimum margin of compliance of the fundamental is 24 dB.

Maximum field strength of spurious emissions is -16.0 dB μ V/m or 0.158 μ V/m at 300 meters at 402.3 kHz. Minimum margin of compliance of the spurious emission is 31.0 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

☒ - 1 meters

☒ - 3 meters

☒ - 10 meter

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
---	LG-105A	Empire	Loop Antenna	N/A	Code B
OWLE02532	ESHS-10	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	828178/006	27-Oct-12
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Version 3.4.71	Software N/A	Code B

Cal Code B = Calibration verification performed internally.

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

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
134.2 kHz	108.0 Qp	0.0 / 0.0 / 0.0 / 0.0	108.0	V / 1.00 / 0	n/a	n/a
above reading at 1 meter - same level ave and peak						
134.2 kHz	84.0 Qp	0.0 / 0.0 / 0.0 / 0.0	84.0	V / 1.00 / 0	n/a	n/a
above reading at 3 meters						
134.2 kHz	61.0 Qp	0.0 / 0.0 / 0.0 / 0.0	61.0	V / 1.00 / 0	n/a	n/a
above reading at 10 meters						
134.2 kHz	1.0 Qp	0.0 / 0.0 / 0.0 / 0.0	1.0	V / 1.00 / 0	n/a	n/a
above reading extrapolated out to 300 meters using 40 dB/decade falloff						
15.209 limit = $2400/134.2 = 17.8 \text{ uV/m} = 25 \text{ dBuV/m}$ - passing margin 24 dB						
eu limit is 66 dBuA/m at 10 meters = 117.1 dBuV/m - passing margin 116 dB						
also, German limit of 42 dBuA/m at 129.1 kHz - ok						
402.3 kHz	64.0 Qp	0.0 / 0.0 / 0.0 / 0.0	64.0	V / 1.00 / 0	n/a	n/a
above readings at 3 meters						
402.3 kHz	-16.0 Qp	0.0 / 0.0 / 0.0 / 0.0	-16.0	V / 1.00 / 0	n/a	n/a
above readings extrapolated to 300 meters using 40 dB/decade falloff						
15.209 limit = $2400/402.3 = 5.9 \text{ uV/m} = 15.4 \text{ dBuV/m}$ - passing margin 31 dB						
fundamental level is below spurious limit, so permitted range of operation & modulation bw ok						

Radiated emissions in the frequency range of 10 kHz to 30 MHz, including the fundamental transmit signal, are measured using a receiver capable of quasi-peak/average/peak measurements and a magnetic loop antenna. The transmitter and loop antenna are 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. Measurements between 150 kHz and 30 MHz are made with a 9 kHz resolution bandwidth. Measurements between 9 kHz and 150 kHz are made with a 200 Hz resolution bandwidth.

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 2009, clause 8.3.

Maximum spurious emission is 25.03 dBμV/m (17.844 μV/m) at 10 meters at 177.0 MHz.

Minimum margin of compliance is 8.47 dB.

Test location

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

Test distance

10 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	16-May-13
OWLE02682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	21-Feb-13
WRLE08052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	14-Feb-13
WRLE08051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	14-Feb-13
NBLE02667	8447D	Hewlett-Packard	Preamplifier	1616A00688	Code B
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code B

Cal Code B = Calibration verification performed internally.

Limit (extrapolated)

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
30 - 88	100	30	10
88 - 216	150	33.5	10
216 - 960	200	36	10
Above 960	500	44	10

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 15.209 <1GHz 10m extrapolated (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 <1GHz 10m extrapolated (dB)
177.0 MHz	38.46 Qp	2.72 / 9.29 / 25.44 / 0.0	25.03	V / 1.00 / 180	-8.47
265.45 MHz	32.65 Qp	3.29 / 12.03 / 25.4 / 0.0	22.56	V / 1.00 / 0	-13.44



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 = 20 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	09-Mar-12
WRLE02418	6502	Electro-Mechanics (EMCO)	Loop Antenna	2215	08-Aug-13
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code B

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

Test limit

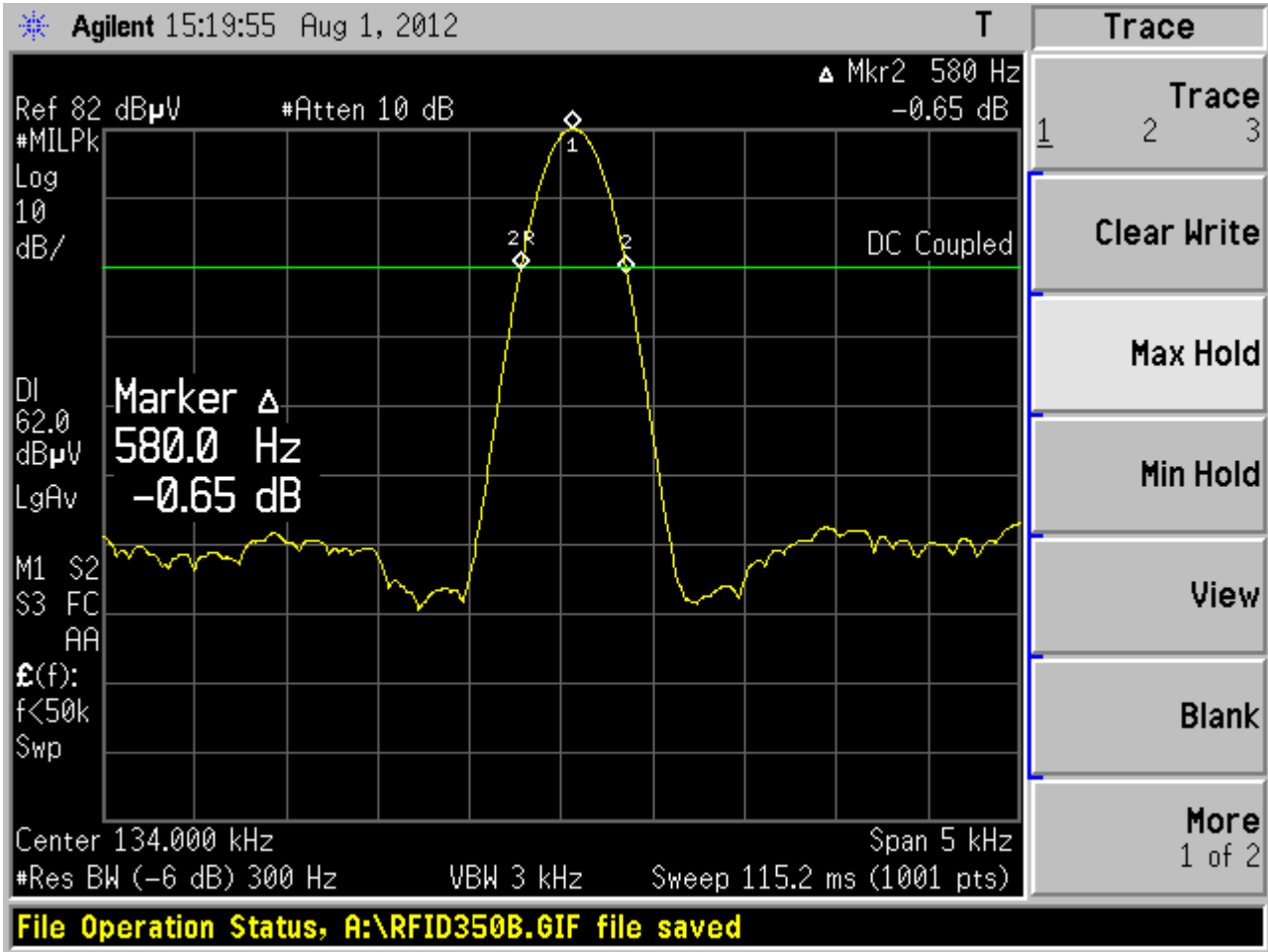
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Test data

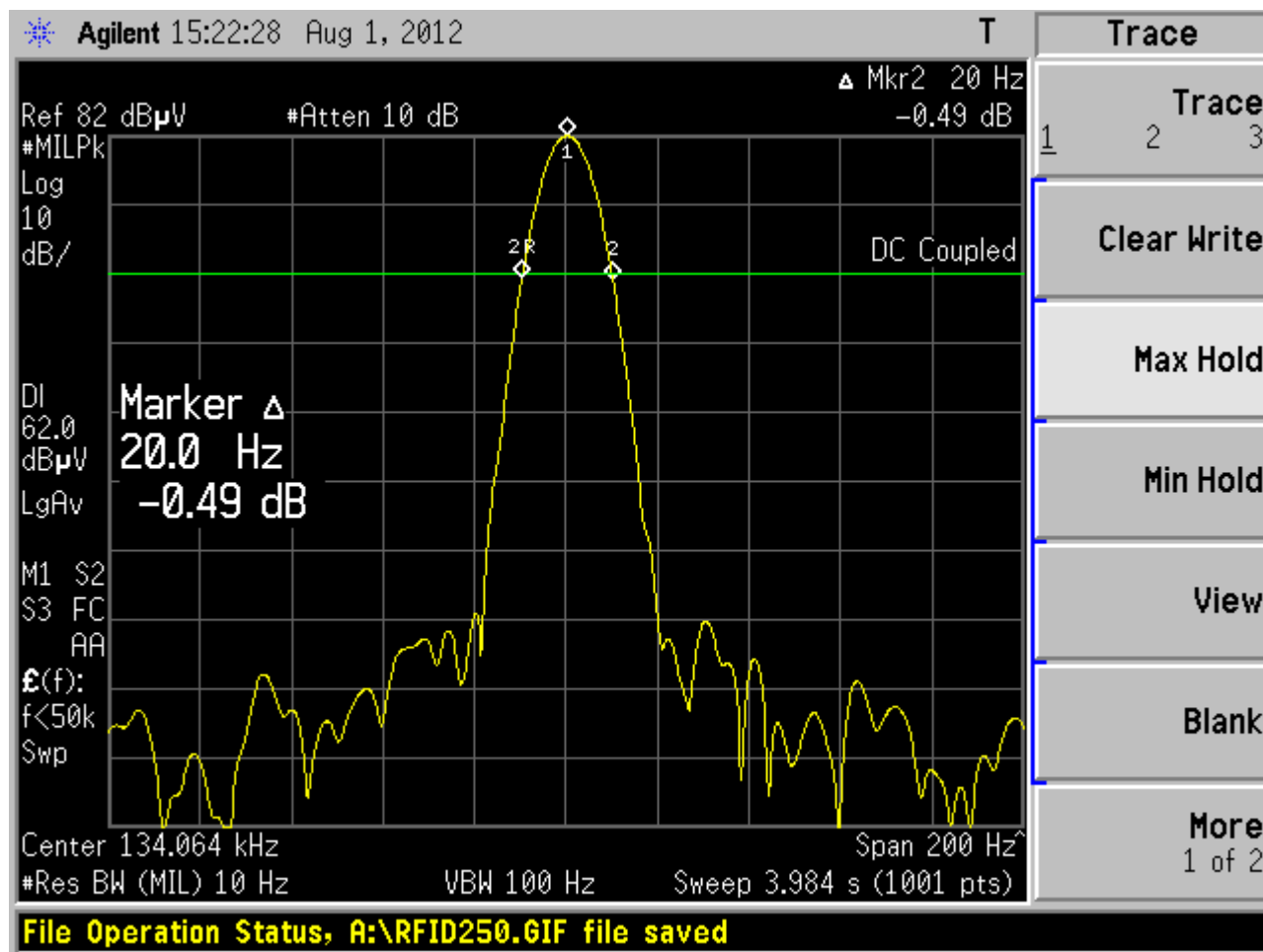
See following pages



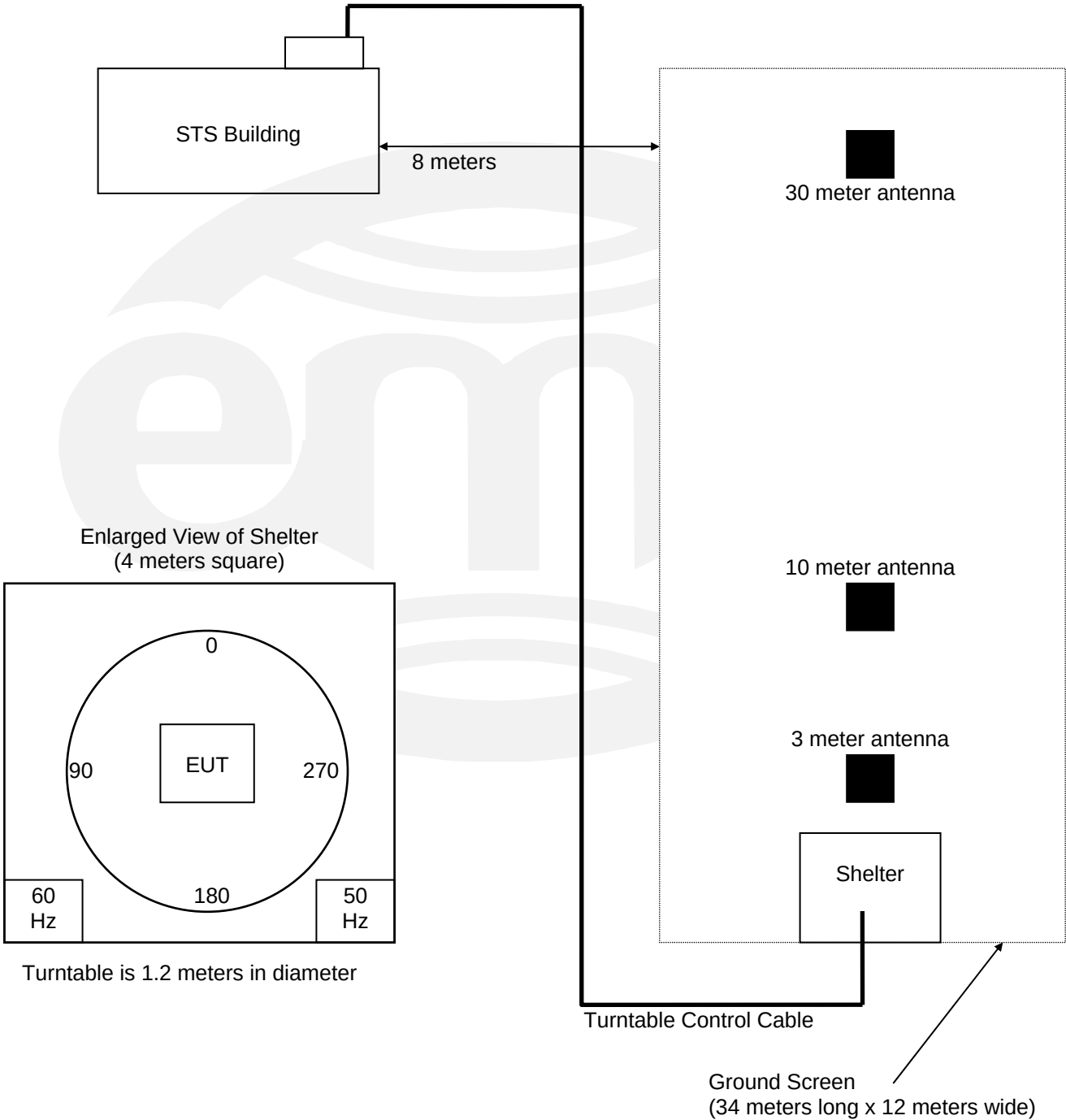
99% Occupied bandwidth
1 of 2



99% Occupied bandwidth
2 of 2



TEST SETUP FOR EMISSIONS TESTING
WILD RIVER LAB
Small Test Site (STS)



Test-setup photo(s):



Test-setup photo(s):



Test-setup photo(s):



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: 31 July 2012

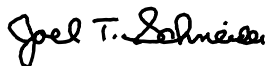
Condition of EUT: Normal

Testing Start Date: 31 July 2012

Testing End Date: 01 August 2012

TÜV SÜD AMERICA INC

Tested by:



Joel T Schneider
Senior EMC Engineer

Approved by:



Robert J Behringer
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: RFID Solutions S.L.
Address: Severo Ochoa 33/35-Parque Tecnologico
Campanillas (Malaga)
Spain 29590.
Contact: Zeke Mejia Position: President
Phone: (34) 637 161 976 Fax: (34) 95 296 0120
E-mail Address: zekemejia@rfidsolutionssl.com

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

EUT Description _____
EUT Name Radio Frequency Identification Reader -(RFID Reader)
Model No.: M250 Serial No.: N/A
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: N/A
Modifications made during test: None

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</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) |
| ☐ Vehicle Directive: ☐ 2001/3/EC (EMC) ☐ 2004/104/EC (EMC) | ☒ Canada: Class ☐ A ☐ B |
| ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | ☐ Australia: Class ☐ A ☐ B |
| | ☐ Other: _____ |

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

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

Form



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): (34)637 161 976
☒ Continue testing to complete test series.
☐ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length: 11.90 cm Width: 7.50cm Height: 1.88 cm Weight: 80 g with battery

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: 3Volts-via battery (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: _____

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

Other Battery current nominal 120 mA

Other Special Requirements

None

Typical Installation and/or Operating Environment

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

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						
EXAMPLE:													
RS232	☐	☒	☒	☐	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	☒ ☐
USB	☐	☒	☐	☒	1	☒	☐			Mini	Standard		☒ ☐
	☐	☐	☐	☐		☐	☐						☐ ☐
	☐	☐	☐	☐		☐	☐						☐ ☐
	☐	☐	☐	☐		☐	☐						☐ ☐
	☐	☐	☐	☐		☐	☐						☐ ☐
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	☐	☐	☐	☐		☐	☐						☐ ☐

Form



EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: REV 0

Description: M250 S/W

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 mode: The reader has only one operating mode and is called "Reading mode". By temporarily depressing the front button, the reader will beep and show in the display "Reading". It will stay in this mode for 10 second and will shut off if no tag is found near it. If a tag is found the reader will keep beeping and displaying the following "MEDCOMP" in line 1 and in line 2 "POWER PORT". After the tag is removed from the reading range the buzzer will stop and after 10 second the reader will automatically shut off.
- 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>

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)

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date