

Zonar Systems, LLC

ZpassV2 RFID Reader

Report No. ZONA0008

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

© 2011 Northwest EMC, Inc

EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Last Date of Test: March 2, 2011
Zonar Systems, LLC
Model: ZpassV2 RFID Reader

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Field Strength of Fundamental	FCC 15.209:2011	ANSI C63.10:2009	Pass
Field Strength of Spurious Emissions	FCC 15.209:2011	ANSI C63.10:2009	Pass
AC Powerline Conducted Emissions	FCC 15.207:2011	ANSI C63.10:2009	Pass

Modifications made to the product

See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1).

Approved By:

Tim O'Shea, Operations Manager



NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



Accreditations and Authorizations

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. *(Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175)*

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



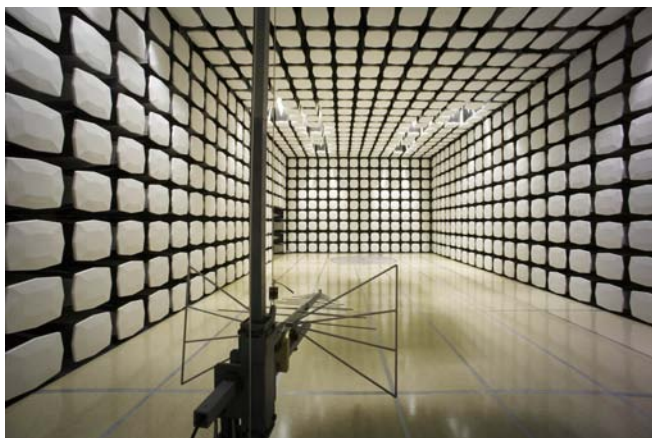
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Northwest EMC	Product Description	Rev 11/17/06
-------------------------	----------------------------	--------------

Party Requesting the Test

Company Name:	Zonar Systems, LLC
Address:	18200 Cascade Ave. S Suite, 200
City, State, Zip:	Seattle, WA 98188
Test Requested By:	Ryan Schoelerman
Model:	ZpassV2 RFID Reader
First Date of Test:	February 11, 2011
Last Date of Test:	March 2, 2011
Receipt Date of Samples:	February 11, 2011
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test
--

Functional Description of the EUT (Equipment Under Test):
RFID reader device operating at 125Khz

Testing Objective:
To demonstrate compliance to FCC 15.209 requirements.

CONFIGURATION 1 ZONA0008

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
RFID Reader	Zonar Systems, LLC	ZpassV2	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Basestation	Zonar Systems, LLC	V2J	2000231
Power Adapter	Scepre Power	PXT1230AW	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power	No	2.0m	No	Power Adapter	Basestation
I/O	No	1.8m	No	Basestation	EUT
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 1 ZONA0019

Software/Firmware Running during test	
Description	Version
Windows XP	2002
EMC Test	1.01

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
EUT	Zonar Systems, LLC	ZpassV2	None

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Modem	Epson	LINK 1200	010351
Host PC	Dell	Dimension 2350	70CNT21
Keyboard	Belkin	P10460	07021683
Mouse	Dell	OF2854	433020509
Monitor	HP	w1907	3CQ81433DT

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Basestation	Zonar Systems, LLC	V2J	2000231
Power Adapter	Scepre Power	PXT1230AW	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power	No	2.0m	No	Power Adapter	Basestation
I/O	No	1.8m	No	Basestation	EUT
Serial	Yes	1.6m	No	Host PC	Modem
AC	No	1.7m	No	Host PC	AC Mains
Keyboard	Yes	1.6m	No	Host PC	Keyboard
Mouse	Yes	1.5m	No	Host PC	Mouse
Video	Yes	1.6m	PA	Host PC	Monitor
AC	No	1.6m	No	Monitor	AC Mains
USB	Yes	1.3m	No	Host PC	EUT
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	2/11/2011	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	2/11/2011	Field Strength of Spurious Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
3	3/2/2011	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

EMC**Field Strength of Fundamental**

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Tx

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ZONA0008 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	10 kHz	Stop Frequency	30 MHz
-----------------	--------	----------------	--------

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV11 Cables	N/A	3m Test Distance Cables	EVM	8/26/2010	13 mo
Antenna, Loop	EMCO	6502	AOA	7/1/2009	24 mo
Spectrum Analyzer	Agilent	E4443A	AFB	1/24/2011	12 mo

MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0

Measurements were made using the IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

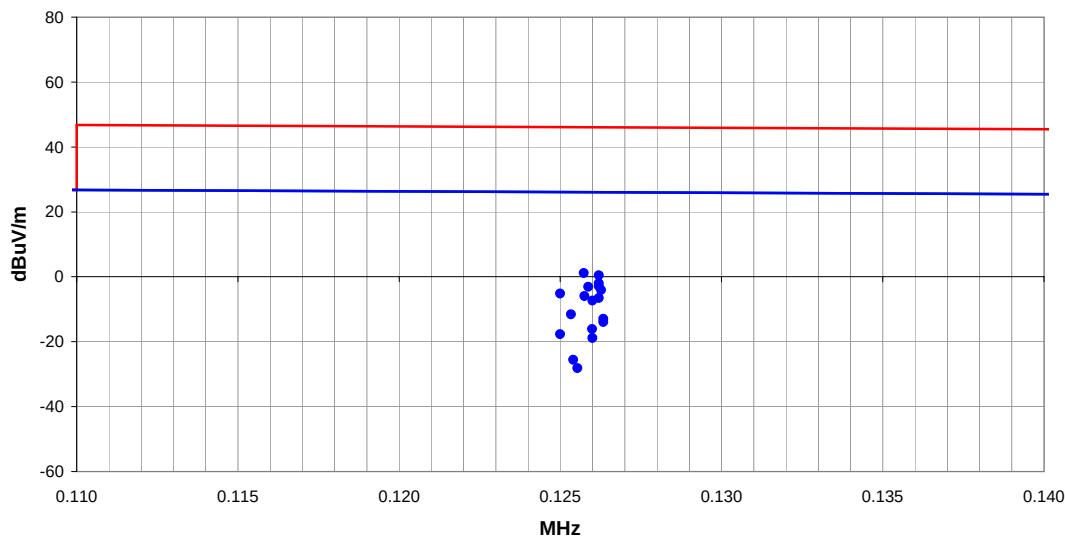
The antenna to be used with the EUT was tested. The EUT was transmitting while set at the channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal plane, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

Work Order:	ZONA0008	Date:	02/11/11	
Project:	None	Temperature:	19.9	
Job Site:	EV11	Humidity:	30	
Serial Number:	None	Barometric Pres.:	1023	
			Tested by:	Ethan Schoonover
EUT:	ZpassV2 RFID Reader			
Configuration:	1 - Basic Configuration			
Customer:	Zonar Systems, LLC			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	None			

Test Specifications
FCC 15.209:2011

Test Method
ANSI C63.10:2009

Run #	5	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
-------	---	-------------------	---	-------------------	------	---------	------



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.126	67.6	12.8	1.8	294.0	3.0	0.0	Horz	AV	-80.0	0.4	25.6	-25.2	EUT Vert. Ant par with EUT
0.126	64.2	12.8	1.8	10.0	3.0	0.0	Horz	AV	-80.0	-3.0	25.6	-28.6	EUT Vert. Ant perp with EUT, perp with floor.
0.126	63.1	12.8	2.0	115.0	3.0	0.0	Vert	AV	-80.0	-4.1	25.6	-29.7	EUT Vert. Ant perp with EUT par to floor.
0.126	60.6	12.8	1.8	202.0	3.0	0.0	Vert	AV	-80.0	-6.6	25.6	-32.2	EUT Onside. Ant perp with EUT par to floor.
0.126	59.8	12.8	1.9	253.0	3.0	0.0	Vert	AV	-80.0	-7.4	25.6	-33.0	EUT Horz. Ant perp with EUT par to floor.
0.126	53.2	12.8	2.1	365.0	3.0	0.0	Horz	AV	-80.0	-14.0	25.6	-39.5	EUT Onside. Ant par with EUT
0.126	51.0	12.8	2.0	312.0	3.0	0.0	Horz	AV	-80.0	-16.2	25.6	-41.8	EUT Horz. Ant par with EUT
0.126	68.3	12.8	1.8	294.0	3.0	0.0	Horz	PK	-80.0	1.1	45.6	-44.5	EUT Vert. Ant par with EUT
0.126	65.1	12.8	1.8	10.0	3.0	0.0	Horz	PK	-80.0	-2.1	45.6	-47.7	EUT Vert. Ant perp with EUT, perp with floor.
0.126	64.0	12.8	2.0	115.0	3.0	0.0	Vert	PK	-80.0	-3.2	45.6	-48.8	EUT Vert. Ant perp with EUT par to floor.
0.125	62.0	12.9	1.8	202.0	3.0	0.0	Vert	PK	-80.0	-5.1	45.7	-50.8	EUT Onside. Ant perp with EUT par to floor.
0.125	41.6	12.8	2.0	263.0	3.0	0.0	Horz	AV	-80.0	-25.6	25.7	-51.2	EUT Onside. Ant perp with EUT perp to floor.
0.126	61.2	12.8	1.9	253.0	3.0	0.0	Vert	PK	-80.0	-6.0	45.6	-51.6	EUT Horz. Ant perp with EUT par to floor.
0.126	39.0	12.8	2.0	351.0	3.0	0.0	Horz	AV	-80.0	-28.2	25.7	-53.8	EUT Horz. Ant perp with EUT, perp with floor.
0.125	55.6	12.8	2.1	365.0	3.0	0.0	Horz	PK	-80.0	-11.6	45.7	-57.2	EUT Onside. Ant par with EUT
0.126	54.2	12.8	2.0	312.0	3.0	0.0	Horz	PK	-80.0	-13.0	45.6	-58.5	EUT Horz. Ant par with EUT
0.125	49.4	12.9	2.0	263.0	3.0	0.0	Horz	PK	-80.0	-17.8	45.7	-63.4	EUT Onside. Ant perp with EUT perp to floor.
0.126	48.3	12.8	2.0	351.0	3.0	0.0	Horz	PK	-80.0	-18.9	45.3	-64.1	EUT Horz. Ant perp with EUT, perp with floor.

EMC**Field Strength of Spurious Emissions**

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Tx

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ZONA0008 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	10 kHz	Stop Frequency	30 MHz
-----------------	--------	----------------	--------

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Loop	EMCO	6502	AOA	7/1/2009	24 mo
EV11 Cables	N/A	3m Test Distance Cables	EVM	8/26/2010	13 mo
Spectrum Analyzer	Agilent	E4443A	AFB	1/24/2011	12 mo

MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0

Measurements were made using the IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

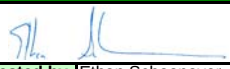
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The antenna to be used with the EUT was tested. The EUT was transmitting while set at the channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and orientation in 3 orthogonal plane, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

EMC

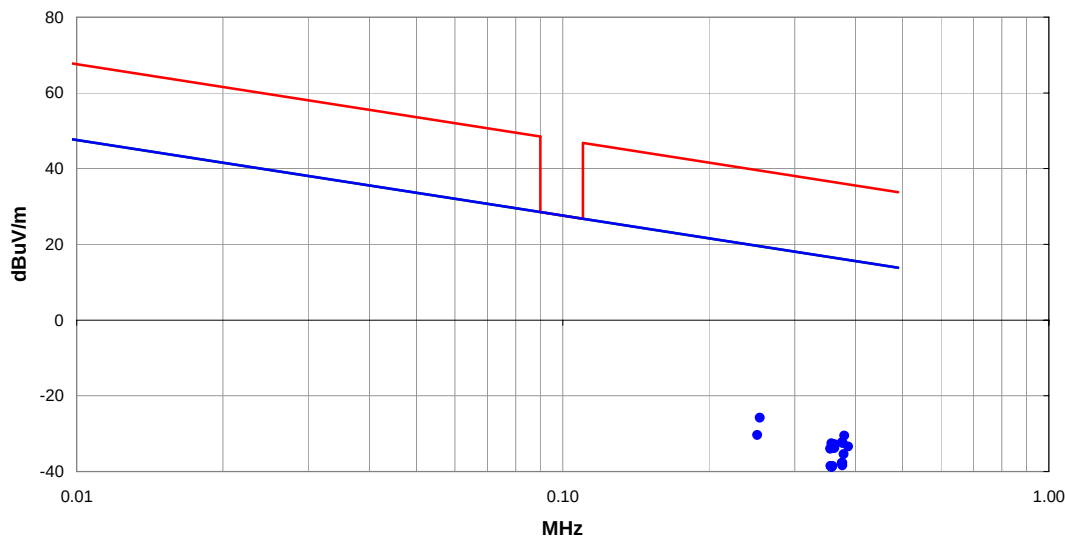
Field Strength of Spurious Emissions

Work Order:	ZONA0008	Date:	02/11/11	
Project:	None	Temperature:	19.9	
Job Site:	EV11	Humidity:	30	
Serial Number:	None	Barometric Pres.:	1023	
Tested by: Ethan Schoonover				
EUT:	ZpassV2 RFID Reader			
Configuration:	1 - Basic Configuration			
Customer:	Zonar Systems, LLC			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	None			

Test Specifications
FCC 15.209:2011

Test Method
ANSI C63.10:2009

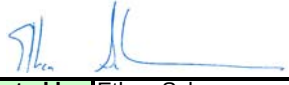
Run #	5	Test Distance (m)	3	Antenna Height(s)	1.8-2.5m	Results	Pass
-------	---	-------------------	---	-------------------	----------	---------	------



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
0.251	36.8	12.8	1.8	312.0	3.0	0.0	Horz	AV	-80.0	-30.4	19.6	-50.0	EUT Vert. Ant par with EUT
0.254	41.4	12.8	1.8	312.0	3.0	0.0	Horz	PK	-80.0	-25.8	39.5	-65.3	EUT Vert. Ant par with EUT
0.355	33.2	12.8	2.0	93.0	3.0	0.0	Vert	PK	-80.0	-34.0	36.6	-70.6	EUT Onside. Ant perp with EUT par to floor.
0.355	28.6	12.8	2.2	306.0	3.0	0.0	Vert	AV	-80.0	-38.6	16.6	-55.2	EUT Horz. Ant perp with EUT par to floor.
0.356	28.6	12.8	2.0	323.0	3.0	0.0	Horz	AV	-80.0	-38.6	16.6	-55.2	EUT Horz. Ant par with EUT
0.357	28.5	12.8	2.5	283.0	3.0	0.0	Horz	AV	-80.0	-38.7	16.6	-55.3	EUT Onside. Ant par with EUT
0.357	34.6	12.8	2.0	15.0	3.0	0.0	Horz	PK	-80.0	-32.6	36.6	-69.2	EUT Vert. Ant perp with EUT perp to floor.
0.358	28.4	12.8	2.0	138.0	3.0	0.0	Horz	AV	-80.0	-38.8	16.5	-55.3	EUT Horz. Ant perp with EUT, perp with floor.
0.358	34.2	12.8	2.0	44.0	3.0	0.0	Horz	PK	-80.0	-33.0	36.5	-69.5	EUT Onside. Ant perp with EUT perp to floor.
0.359	28.6	12.8	2.0	44.0	3.0	0.0	Horz	AV	-80.0	-38.6	16.5	-55.1	EUT Onside. Ant perp with EUT perp to floor.
0.362	33.4	12.8	2.0	323.0	3.0	0.0	Horz	PK	-80.0	-33.8	36.4	-70.2	EUT Horz. Ant par with EUT
0.363	34.4	12.8	2.0	138.0	3.0	0.0	Horz	PK	-80.0	-32.8	36.4	-69.2	EUT Horz. Ant perp with EUT, perp with floor.
0.375	29.4	12.8	2.0	15.0	3.0	0.0	Horz	AV	-80.0	-37.8	16.1	-53.9	EUT Vert. Ant perp with EUT perp to floor.
0.376	34.9	12.8	2.2	306.0	3.0	0.0	Vert	PK	-80.0	-32.3	36.1	-68.4	EUT Horz. Ant perp with EUT par to floor.
0.376	28.8	12.8	2.0	93.0	3.0	0.0	Vert	AV	-80.0	-38.4	16.1	-54.5	EUT Onside. Ant perp with EUT par to floor.
0.376	29.5	12.8	2.0	324.0	3.0	0.0	Vert	AV	-80.0	-37.7	16.1	-53.8	EUT Vert. Ant perp with EUT par to floor.
0.377	34.7	12.8	2.0	324.0	3.0	0.0	Vert	PK	-80.0	-32.5	36.1	-68.6	EUT Vert. Ant perp with EUT par to floor.
0.379	31.8	12.8	1.8	318.0	3.0	0.0	Horz	AV	-80.0	-35.4	16.0	-51.4	EUT Vert. Ant par with EUT
0.380	36.7	12.8	1.8	318.0	3.0	0.0	Horz	PK	-80.0	-30.5	36.0	-66.5	EUT Vert. Ant par with EUT
0.386	33.8	12.8	2.5	283.0	3.0	0.0	Horz	PK	-80.0	-33.4	35.9	-69.3	EUT Onside. Ant par with EUT

EMC

Field Strength of Spurious Emissions

Work Order:	ZONA0008	Date:	02/11/11	
Project:	None	Temperature:	19.9	
Job Site:	EV11	Humidity:	30	
Serial Number:	None	Barometric Pres.:	1023	Tested by: Ethan Schoonover
EUT:	ZpassV2 RFID Reader			
Configuration:	1 - Basic Configuration			
Customer:	Zonar Systems, LLC			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Tx			
Deviations:	None			
Comments:	EUT Vert			

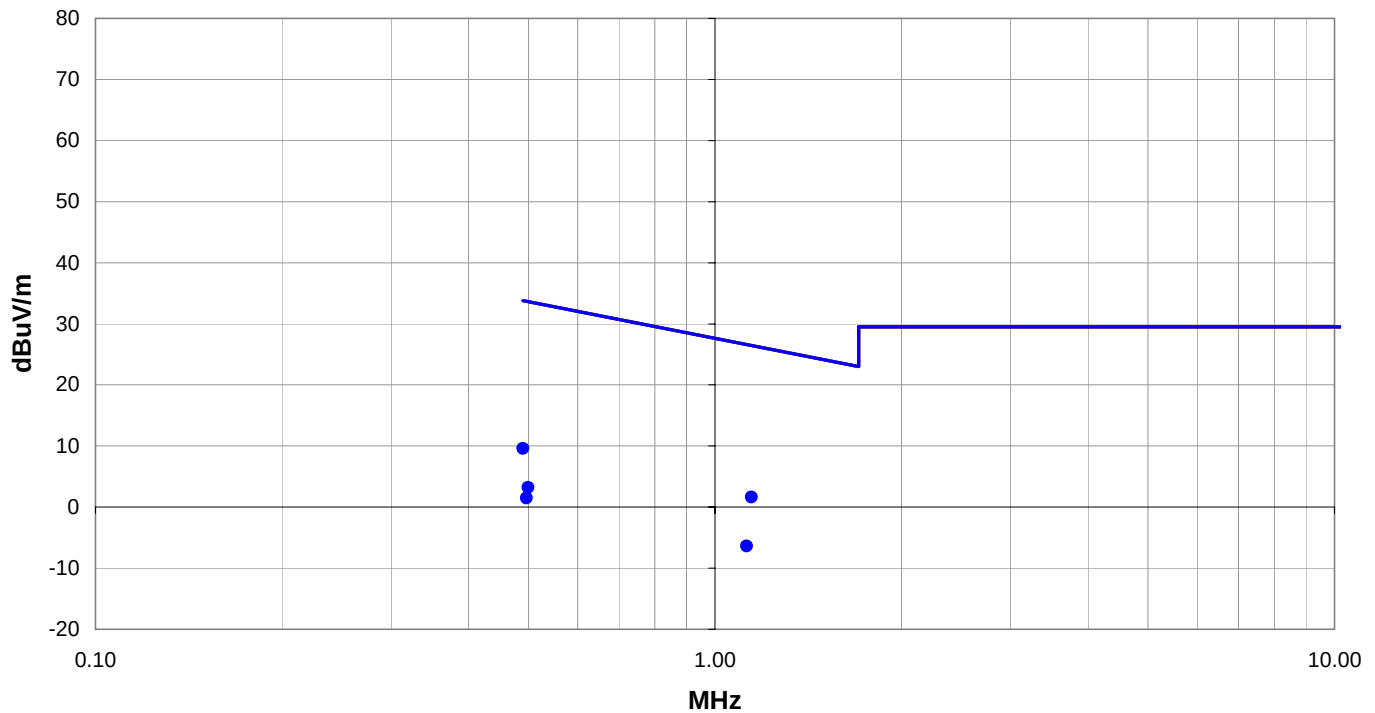
Test Specifications

FCC 15.209:2011

Test Method

ANSI C63.10:2009

Run #	6	Test Distance (m)	3	Antenna Height(s)	1.8-2.5m	Results	Pass
--------------	---	--------------------------	---	--------------------------	----------	----------------	------



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
1.145	30.8	10.8	2.0	202.0	3.0	0.0	Horz	QP	-40.0	1.6	26.5	-24.8
1.125	22.8	10.8	2.0	202.0	3.0	0.0	Horz	QP	-40.0	-6.4	26.6	-33.0
0.499	32.5	10.7	1.8	301.0	3.0	0.0	Horz	QP	-40.0	3.2	33.6	-30.4
0.496	30.8	10.7	2.0	72.0	3.0	0.0	Horz	QP	-40.0	1.5	33.7	-32.2
0.490	38.9	10.7	2.0	72.0	3.0	0.0	Horz	QP	-40.0	9.6	33.8	-24.2

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Tx

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ZONA0019 - 1

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIN	5/27/2010	12 mo
LISN	Solar	9252-50-R-24-BNC	LIP	7/22/2010	12 mo
EV07 Cables	N/A	Conducted Cables	EVG	6/21/2010	13 mo
Attenuator	Coaxicom	66702 2910-20	ATO	8/6/2010	13 mo
High Pass Filter	TTE	H97-100K-50-720B	HFX	2/9/2011	13 mo
Receiver	Rohde & Schwarz	ESCI	ARE	4/29/2010	12 mo

MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

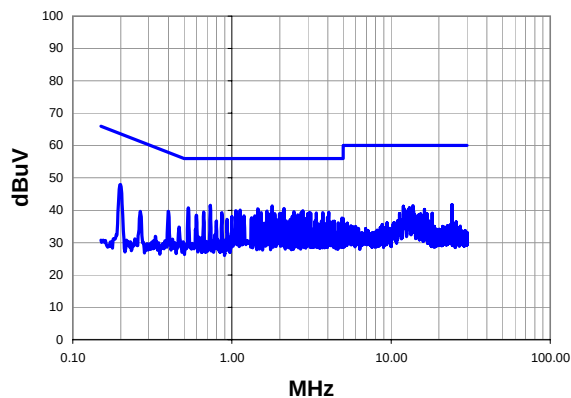
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

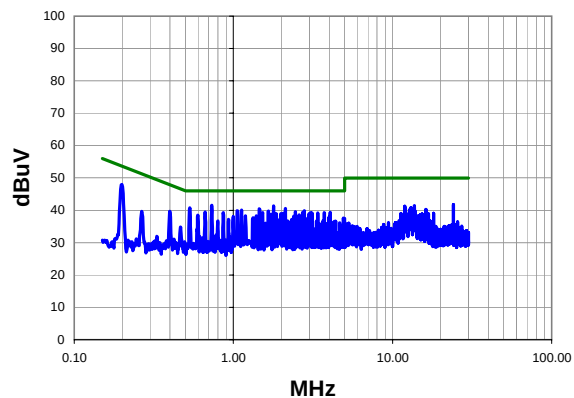
The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

Work Order:	ZONA0019	Date:	03/02/11				
Project:	None	Temperature:	19.9				
Job Site:	EV07	Humidity:	30				
Serial Number:	None	Barometric Pres.:	1023				
EUT:	RFID Reader (ZPASSV2)						
Configuration:	1 - Basic Config						
Customer:	Zonar Systems, LLC						
Attendees:	None						
EUT Power:	120VAC/60Hz						
Operating Mode:	Tx						
Deviations:	None						
Comments:	None						
Test Specifications FCC 15.207:2011			Test Method ANSI C63.10:2009				
Run #	1	Line:	High Line	Ext. Attenuation:	20	Results	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

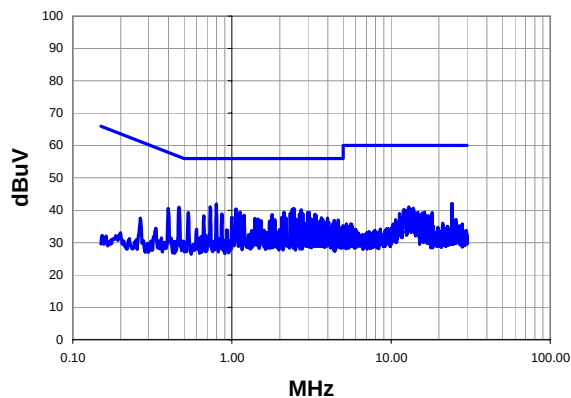
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.731	21.4	20.2	41.6	56.0	-14.4
1.792	21.1	20.2	41.3	56.0	-14.7
0.533	20.6	20.2	40.8	56.0	-15.2
2.128	20.4	20.2	40.6	56.0	-15.4
1.456	20.3	20.2	40.5	56.0	-15.5
0.199	27.8	20.2	48.0	63.6	-15.7
1.128	19.9	20.2	40.1	56.0	-15.9
2.792	19.7	20.2	39.9	56.0	-16.1
1.056	19.7	20.2	39.9	56.0	-16.1
1.664	19.6	20.2	39.8	56.0	-16.2
2.456	19.4	20.2	39.6	56.0	-16.4
0.665	19.3	20.2	39.5	56.0	-16.5
2.728	19.2	20.2	39.4	56.0	-16.6
4.056	19.1	20.2	39.3	56.0	-16.7
1.528	19.1	20.2	39.3	56.0	-16.7
0.864	19.1	20.2	39.3	56.0	-16.7
3.720	19.0	20.2	39.2	56.0	-16.8
3.056	19.0	20.2	39.2	56.0	-16.8
3.120	18.9	20.2	39.1	56.0	-16.9
3.392	18.9	20.2	39.1	56.0	-16.9

Peak Data - vs - Average Limit

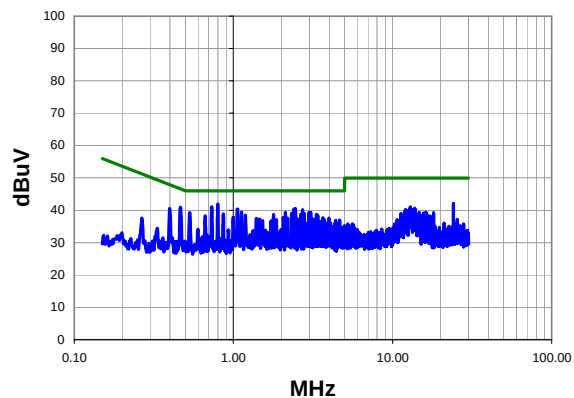
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.731	21.4	20.2	41.6	46.0	-4.4
1.792	21.1	20.2	41.3	46.0	-4.7
0.533	20.6	20.2	40.8	46.0	-5.2
2.128	20.4	20.2	40.6	46.0	-5.4
1.456	20.3	20.2	40.5	46.0	-5.5
0.199	27.8	20.2	48.0	53.6	-5.7
1.128	19.9	20.2	40.1	46.0	-5.9
2.792	19.7	20.2	39.9	46.0	-6.1
1.056	19.7	20.2	39.9	46.0	-6.1
1.664	19.6	20.2	39.8	46.0	-6.2
2.456	19.4	20.2	39.6	46.0	-6.4
0.665	19.3	20.2	39.5	46.0	-6.5
2.728	19.2	20.2	39.4	46.0	-6.6
4.056	19.1	20.2	39.3	46.0	-6.7
1.528	19.1	20.2	39.3	46.0	-6.7
0.864	19.1	20.2	39.3	46.0	-6.7
3.720	19.0	20.2	39.2	46.0	-6.8
3.056	19.0	20.2	39.2	46.0	-6.8
3.120	18.9	20.2	39.1	46.0	-6.9
3.392	18.9	20.2	39.1	46.0	-6.9

Work Order:	ZONA0019	Date:	03/02/11				
Project:	None	Temperature:	19.9				
Job Site:	EV07	Humidity:	30				
Serial Number:	None	Barometric Pres.:	1023				
EUT:	RFID Reader (ZPASSV2)						
Configuration:	1 - Basic Config						
Customer:	Zonar Systems, LLC						
Attendees:	None						
EUT Power:	120VAC/60Hz						
Operating Mode:	Tx						
Deviations:	None						
Comments:	None						
Test Specifications FCC 15.207:2011			Test Method ANSI C63.10:2009				
Run #	2	Line:	Neutral	Ext. Attenuation:	20	Results	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.798	21.8	20.2	42.0	56.0	-14.0
0.730	20.9	20.2	41.1	56.0	-14.9
2.456	20.3	20.2	40.5	56.0	-15.5
1.064	20.2	20.2	40.4	56.0	-15.6
0.465	20.8	20.2	41.0	56.6	-15.6
2.392	20.1	20.2	40.3	56.0	-15.7
2.728	19.9	20.2	40.1	56.0	-15.9
1.128	19.3	20.2	39.5	56.0	-16.5
2.120	19.2	20.2	39.4	56.0	-16.6
2.992	19.1	20.2	39.3	56.0	-16.7
3.056	19.1	20.2	39.3	56.0	-16.7
0.533	19.1	20.2	39.3	56.0	-16.7
2.328	18.9	20.2	39.1	56.0	-16.9
2.792	18.8	20.2	39.0	56.0	-17.0
0.864	18.7	20.2	38.9	56.0	-17.1
3.320	18.6	20.2	38.8	56.0	-17.2
2.656	18.6	20.2	38.8	56.0	-17.2
1.792	18.5	20.2	38.7	56.0	-17.3
0.398	20.4	20.2	40.6	57.9	-17.3
1.192	18.3	20.2	38.5	56.0	-17.5

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.798	21.8	20.2	42.0	46.0	-4.0
0.730	20.9	20.2	41.1	46.0	-4.9
2.456	20.3	20.2	40.5	46.0	-5.5
1.064	20.2	20.2	40.4	46.0	-5.6
0.465	20.8	20.2	41.0	46.6	-5.6
2.392	20.1	20.2	40.3	46.0	-5.7
2.728	19.9	20.2	40.1	46.0	-5.9
1.128	19.3	20.2	39.5	46.0	-6.5
2.120	19.2	20.2	39.4	46.0	-6.6
2.992	19.1	20.2	39.3	46.0	-6.7
3.056	19.1	20.2	39.3	46.0	-6.7
0.533	19.1	20.2	39.3	46.0	-6.7
2.328	18.9	20.2	39.1	46.0	-6.9
2.792	18.8	20.2	39.0	46.0	-7.0
0.864	18.7	20.2	38.9	46.0	-7.1
3.320	18.6	20.2	38.8	46.0	-7.2
2.656	18.6	20.2	38.8	46.0	-7.2
1.792	18.5	20.2	38.7	46.0	-7.3
0.398	20.4	20.2	40.6	47.9	-7.3
1.192	18.3	20.2	38.5	46.0	-7.5