ADDENDUM TO ZONAR SYSTEMS TEST REPORT FC08-079A

FOR THE

RF READER, ID125

FCC PART 15 SUBPART C SECTION 15.209,
SUBPART B SECTION 15.109 CLASS B AND RSS-210 ISSUE 7

TESTING

DATE OF ISSUE: SEPTEMBER 18, 2008

PREPARED FOR:

Zonar Systems
18200 Cascade Ave. S, Suite 200
Seattle, WA 98188

P.O. No.: 10178
W.O. No.: 88434

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Date of test: July 23-24, 2008

Report No.: FC08-079A

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

DATE OF TEST: July 23-24, 2008

DATE OF RECEIPT: July 23, 2008

REPRESENTATIVE: Greg Colvin

MANUFACTURER:
Zonar Systems
18200 Cascade Ave. S, Suite 200
Seattle, WA 98188

TEST LOCATION:
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

TEST METHOD: ANSI C63.4 (2003), RSS-210 Issue 7 and RSS-GEN Issue 2

PURPOSE OF TEST:
Original Report: To perform the testing of the RF Reader, ID125 with the requirements for FCC Part 15 Subpart C Section 15.209 and Subpart B Section 15.109 Class B devices.
Addendum A: To correct the data sheet on page 13, to add documentation of 15.31(e) testing, and to add the support equipment on pages 9, 16 and 18 with no new testing.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Amrinder Brar, EMC Engineer/Lab Manager

TEST PERSONNEL:

Benny Lován, Test Engineer

SUMMARY OF RESULTS

Test	Specification	Results
Radiated Emissions	FCC Part 15 Subpart B Section 15.109 Class B	Pass
Radiated Emissions	FCC Part 15 Subpart C Section 15.209 RSS-210 Issue 7/RSS-GEN Issue 2	Pass
Occupied Bandwidth		Pass
Site File No.	FCC Site No.318736 Industry of Canada File No. IC 4653	

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

FCC 15.31(m) Number Of Channels
This device operates on a single channel.

FCC 15.33(a) Frequency Ranges Tested
15.109 Radiated Emissions: 30 MHz – 1000 MHz
15.209 Radiated Emissions: 9 kHz – 1000 MHz

FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

FCC 15.31(e) Voltage Variations
Voltage Variations were measured in accordance with 15.31(e). During this test no measurable change was detected.

FCC 15.203 Antenna Requirements
The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

EUT Operating Frequency
The EUT was operating at 125 kHz.

Temperature And Humidity During Testing
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

RF Reader

Manuf: Zonar Systems Inc.
Model: ID125
Serial: NA

The EUT was tested with the following peripheral device(s):

Interface Box

Manuf: Zonar Systems Inc.
Model: ZPASS
Serial: Z1-125

REPORT OF EMISSIONS MEASUREMENTS

TESTING PARAMETERS

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. The following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer/receiver readings were recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.

FCC 15.109 RADIATED EMISSIONS

Test Setup Photos

Test Data Sheets

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Zonar Systems**
Specification: **15.109 CLASS B**
Work Order #: **88343** Date: 7/23/2008
Test Type: **Radiated Scan** Time: 1:36:19 PM
Equipment: **RF Reader** Sequence#: 15
Manufacturer: Zonar Systems Inc. Tested By: Benny Lován
Model: ID125
S/N: None

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4440A	S/N: MY46186330	01/31/2008	01/31/2010	AN02872
HP 8447D PreAmp	S/N: 2944A08601	07/08/2008	07/08/2010	AN01517
20' RG-214 Coax	S/N: 16	11/09/2006	11/09/2008	ANP05360
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993
Cable 30'	RG214 11	11/09/2006	11/09/2008	ANP05366
Cable 6'	RG214 49	11/09/2006	11/09/2008	ANP05371
Cable 6'	RG214 51	11/09/2006	11/09/2008	ANP05361

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
RF Reader*	Zonar Systems Inc.	ID125	None

Support Devices:

Function	Manufacturer	Model #	S/N
Interface Box	Zonar Systems Inc.	ZPASS	Z1-125

Test Conditions / Notes:

Radiated Emissions to FCC Part 15.109. EUT is an RF Reader and it is located at the back edge of the table with its cable routed under the table to the interface box and then from that box to the outside of the chamber to the power supply. The interface box has no info (Model, Serial, etc.).

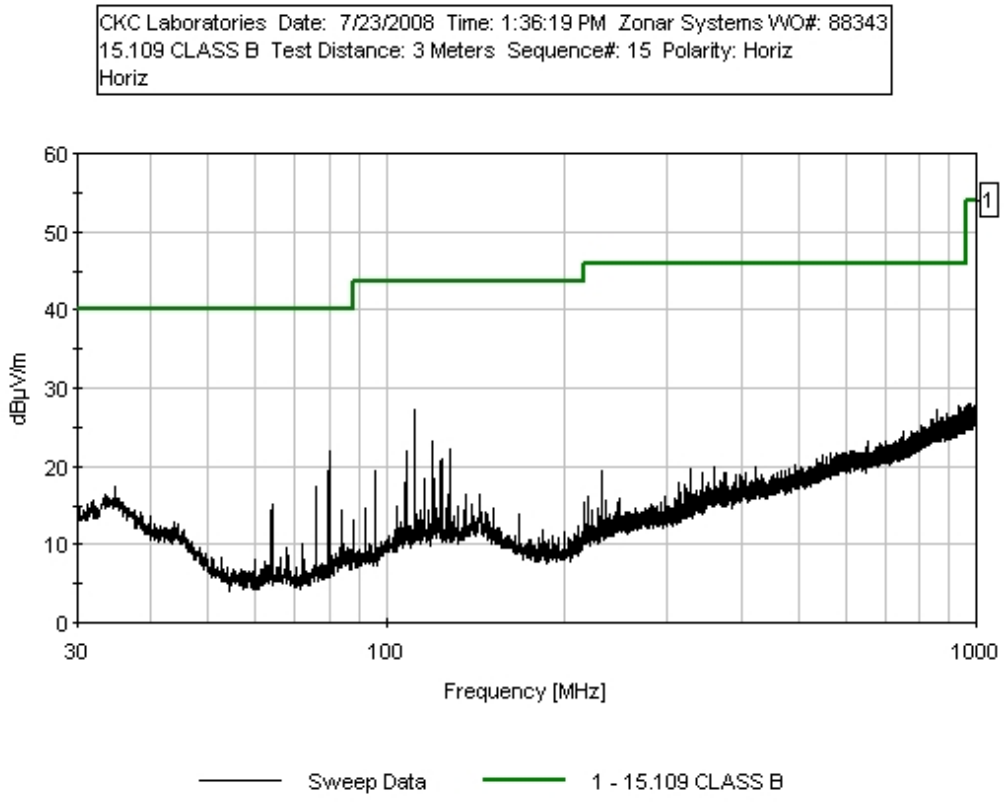
Transducer Legend:

T1=CAB-ANP05361	T2=CAB-ANP05360-110906
T3=CAB-ANP05366	T4=CAB-ANP05371
T5=ANT AN01993 25-1000MHz	T6=AMP-AN01517-070808

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	112.044M	48.5	+0.2 +11.1	+0.6 -29.0	+0.7	+0.1	+0.0 360	32.2	43.5	-11.3	Vert 130
2	79.978M	48.3	+0.1 +7.4	+0.6 -29.1	+0.6	+0.2	+0.0 360	28.1	40.0	-11.9	Vert 130
3	107.960M	46.9	+0.2 +10.8	+0.6 -29.1	+0.6	+0.2	+0.0 360	30.2	43.5	-13.3	Vert 130
4	96.017M	47.5	+0.1 +9.7	+0.7 -29.1	+0.6	+0.2	+0.0 360	29.7	43.5	-13.8	Vert 130

5	83.971M	43.6	+0.1 +8.0	+0.7 -29.1	+0.6	+0.2	+0.0 360	24.1	40.0	-15.9	Vert 130
6	33.727M	35.6	+0.2 +16.4	+0.3 -29.1	+0.3	+0.0	+0.0 360	23.7	40.0	-16.3	Vert 130
7	112.044M	43.5	+0.2 +11.1	+0.6 -29.0	+0.7	+0.1	+0.0	27.2	43.5	-16.3	Horiz 130
8	79.978M	42.2	+0.1 +7.4	+0.6 -29.1	+0.6	+0.2	+0.0	22.0	40.0	-18.0	Horiz 130
9	932.344M	28.0	+0.4 +23.8	+2.0 -29.2	+2.2	+0.5	+0.0	27.7	46.0	-18.3	Horiz 130
10	937.890M	27.9	+0.4 +23.8	+2.0 -29.2	+2.2	+0.5	+0.0	27.6	46.0	-18.4	Horiz 130
11	958.238M	27.6	+0.5 +24.1	+2.0 -29.2	+2.1	+0.4	+0.0	27.5	46.0	-18.5	Horiz 130
12	940.895M	27.6	+0.4 +23.9	+2.0 -29.2	+2.2	+0.5	+0.0	27.4	46.0	-18.6	Horiz 130



FCC 15.209 RADIATED EMISSIONS

Test Setup Photos

Transmitter Check at 30M

Test Data Sheets

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Zonar Systems**
Specification: **FCC 15.209**
Work Order #: **88434** Date: 7/24/2008
Test Type: **Maximized Emissions** Time: 16:19:36
Equipment: **RF Reader** Sequence#: 10
Manufacturer: Zonar Systems Inc. Tested By: Benny Lován
Model: ID125
S/N: None

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
QP Adapter	2811A01065	06/12/2008	06/12/2010	AN00707
HP Spectrum Analyzer	2634A02958	10/11/2007	10/11/2009	02305
SA Display	2403A06676	10/11/2007	10/11/2009	00684
Cable 30'	RG214 11	11/09/2006	11/09/2008	ANP05366
Cable 6'	RG214 49	11/09/2006	11/09/2008	ANP05371
Cable 6'	RG214 51	11/09/2006	11/09/2008	ANP05361
20' RG-214 Coax	S/N: 16	11/09/2006	11/09/2008	ANP05360
Mag Loop	2156	06/04/2008	06/04/2010	AN00052

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
RF Reader*	Zonar Systems Inc.	ID125	None

Support Devices:

Function	Manufacturer	Model #	S/N
Interface Box	Zonar Systems Inc.	ZPASS	Z1-125

Test Conditions / Notes:

Radiated Emissions to FCC Part 15.209. EUT is an RF Reader and it is located at the back edge of the table with its cable routed under the table to the interface box and then from that box to the outside of the chamber to the power supply. Frequency range tested: 9kHz – 30MHz.

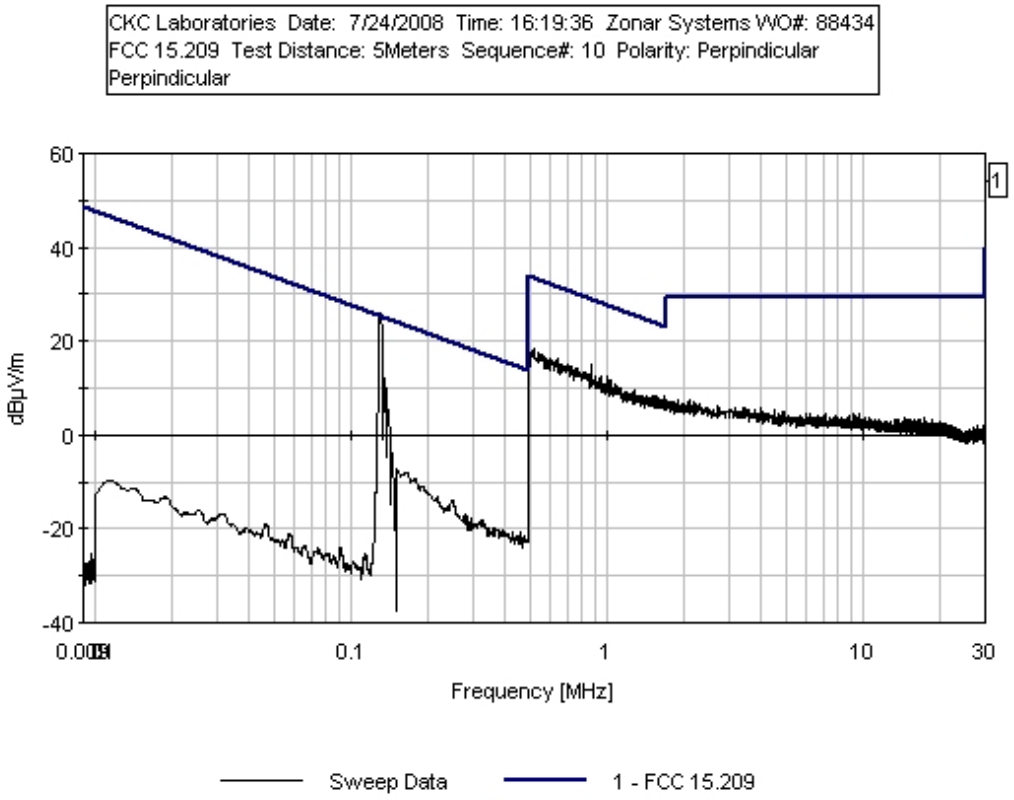
Transducer Legend:

T1=ANT- AN00052-06042008	T2=CAB-ANP05360-110906
T3=CAB-ANP05366	T4=CAB-ANP05361
T5=CAB-ANP05371	

Measurement Data: Reading listed by margin. Test Distance: 5Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	135.739k	73.6	+9.9 +0.0	+0.0	+0.0	+0.0	-71.0 360	12.5	24.9	-12.4	Paral 104
2	135.599k	73.2	+9.9 +0.0	+0.0	+0.0	+0.0	-71.0	12.1	25.0	-12.9	Perpi 104
3	865.122k	35.6	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0	14.9	28.8	-13.9	Perpi 104

4	614.202k	38.4	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0 360	17.7	31.8	-14.1	Paral 104
5	528.471k	39.5	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0 360	18.8	33.1	-14.3	Paral 104
6	619.510k	37.8	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0	17.1	31.7	-14.6	Perpi 104
7	645.567k	37.4	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0 360	16.7	31.4	-14.7	Paral 104
8	496.400k	39.6	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0	18.9	33.7	-14.8	Perpi 104
9	515.925k	39.2	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0	18.5	33.3	-14.8	Perpi 104
10	1.005M	33.2	+10.0 +0.1	+0.1	+0.1	+0.1	-31.0	12.6	27.5	-14.9	Perpi 104
11	1.664M	28.5	+10.3 +0.1	+0.1	+0.1	+0.1	-31.0	8.2	23.1	-14.9	Perpi 104
12	561.927k	38.4	+9.9 +0.1	+0.1	+0.1	+0.1	-31.0 360	17.7	32.6	-14.9	Paral 104
13	248.410k	46.3	+9.9 +0.0	+0.0	+0.0	+0.0	-71.0	-14.8	19.7	-34.5	Perpi 104
14	375.910k	23.2	+9.8 +0.1	+0.1	+0.1	+0.1	-71.0	-37.6	16.1	-53.7	Paral 104
15	250.900k	25.0	+9.9 +0.0	+0.0	+0.0	+0.0	-71.0	-36.1	19.6	-55.7	Paral 104


CKC Laboratories Date: 7/24/2008 Time: 16:19:36 Zonar Systems WO#: 88434
FCC 15.209 Test Distance: 5Meters Sequence#: 10 Polarity: Perpindicular
Perpindicular
60
40
20
0
-20
-40
dBµV/m
0.1
1
10
30
Frequency [MHz]
1
Sweep Data
1 - FCC 15.209

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Zonar Systems**
Specification: **FCC 15.209**
Work Order #: **88343** Date: 7/23/2008
Test Type: **Maximized Emissions** Time: 1:36:19 PM
Equipment: **RF Reader** Sequence#: 2
Manufacturer: Zonar Systems Inc. Tested By: Benny Lován
Model: ID125
S/N: None

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4440A	S/N: MY46186330	01/31/2008	01/31/2010	AN02872
HP 8447D PreAmp	S/N: 2944A08601	07/10/2006	07/10/2008	AN01517
20' RG-214 Coax	S/N: 16	11/09/2006	11/09/2008	ANP05360
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993
Cable 30'	RG214 11	11/09/2006	11/09/2008	ANP05366
Cable 6'	RG214 49	11/09/2006	11/09/2008	ANP05371
Cable 6'	RG214 51	11/09/2006	11/09/2008	ANP05361

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
RF Reader*	Zonar Systems Inc.	ID125	None

Support Devices:

Function	Manufacturer	Model #	S/N
Interface Box	Zonar Systems Inc.	ZPASS	Z1-125

Test Conditions / Notes:

Radiated Emissions to FCC Part 15.209. EUT is an RF Reader and it is located at the back edge of the table with its cable routed under the table to the interface box and then from that box to the outside of the chamber to the power supply. The interface box has no info (Model, Serial, etc.). Frequency range tested: 30-1000MHz.

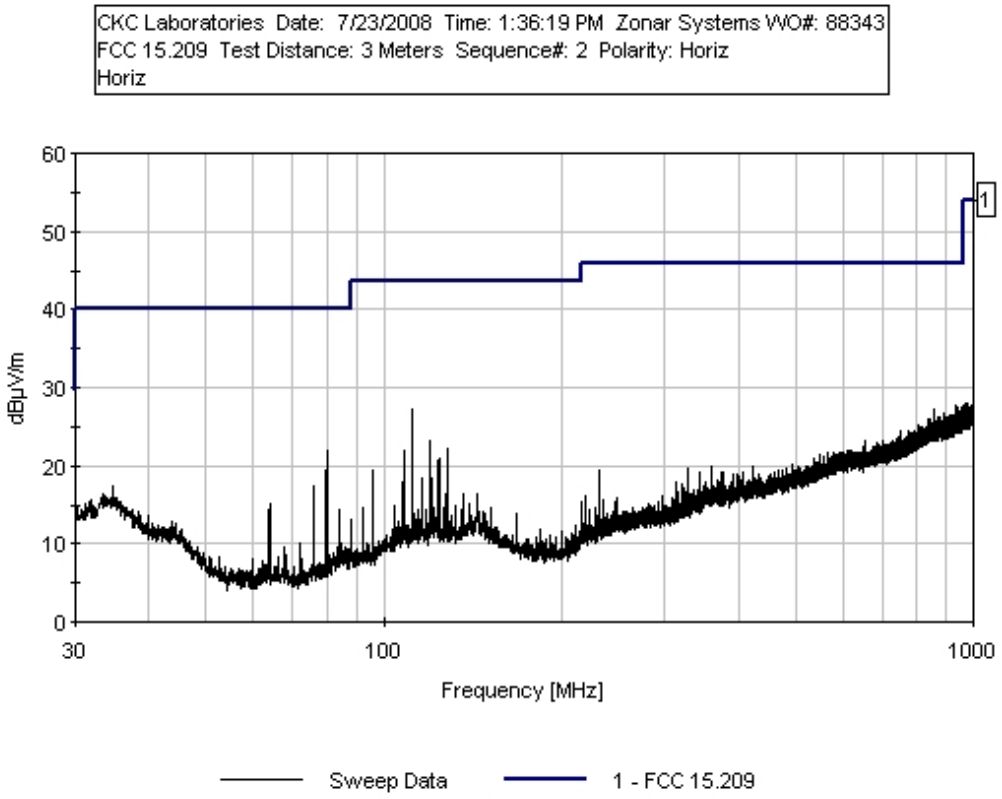
Transducer Legend:

T1=CAB-ANP05361	T2=CAB-ANP05360-110906
T3=CAB-ANP05366	T4=CAB-ANP05371
T5=ANT AN01993 25-1000MHz	T6=AMP-AN01517-070808

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	112.044M	48.5	+0.2 +11.1	+0.6 -29.0	+0.7	+0.1	+0.0 360	32.2	43.5	-11.3	Vert 130
2	79.978M	48.3	+0.1 +7.4	+0.6 -29.1	+0.6	+0.2	+0.0 360	28.1	40.0	-11.9	Vert 130
3	107.960M	46.9	+0.2 +10.8	+0.6 -29.1	+0.6	+0.2	+0.0 360	30.2	43.5	-13.3	Vert 130
4	96.017M	47.5	+0.1 +9.7	+0.7 -29.1	+0.6	+0.2	+0.0 360	29.7	43.5	-13.8	Vert 130
5	83.971M	43.6	+0.1 +8.0	+0.7 -29.1	+0.6	+0.2	+0.0 360	24.1	40.0	-15.9	Vert 130

6	112.044M	43.5	+0.2 +11.1	+0.6 -29.0	+0.7	+0.1	+0.0	27.2	43.5	-16.3	Horiz 130
7	33.727M	35.6	+0.2 +16.4	+0.3 -29.1	+0.3	+0.0	+0.0 360	23.7	40.0	-16.3	Vert 130
8	79.978M	42.2	+0.1 +7.4	+0.6 -29.1	+0.6	+0.2	+0.0	22.0	40.0	-18.0	Horiz 130
9	932.344M	28.0	+0.4 +23.8	+2.0 -29.2	+2.2	+0.5	+0.0	27.7	46.0	-18.3	Horiz 130
10	937.890M	27.9	+0.4 +23.8	+2.0 -29.2	+2.2	+0.5	+0.0	27.6	46.0	-18.4	Horiz 130
11	958.238M	27.6	+0.5 +24.1	+2.0 -29.2	+2.1	+0.4	+0.0	27.5	46.0	-18.5	Horiz 130
12	940.895M	27.6	+0.4 +23.9	+2.0 -29.2	+2.2	+0.5	+0.0	27.4	46.0	-18.6	Horiz 130



Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Zonar Systems**
Specification: **FCC 15.209**
Work Order #: **88434** Date: 7/23/2008
Test Type: **Maximized Emissions** Time: 14:59:39
Equipment: **RF Reader** Sequence#: 1
Manufacturer: Zonar Systems Inc. Tested By: Benny Lován
Model: ID125
S/N: None

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4440A	S/N: MY46186330	01/31/2008	01/31/2010	AN02872
Mag Loop Antenna	2156	06/04/2008	06/04/2010	AN00052

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
RF Reader*	Zonar Systems Inc.	ID125	None

Support Devices:

Function	Manufacturer	Model #	S/N
Interface Box	Zonar Systems Inc.	ZPASS	Z1-125

Test Conditions / Notes:

Frequency tested: Carrier.

Transducer Legend:

T1=ANT- AN00052-06042008	T2=Distance Correction

Measurement Data: Reading listed by margin. Test Distance: 300 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	125.044k	55.6	+10.0	-42.8			+0.0	22.8	25.7	-2.9	180de

OCCUPIED BANDWIDTH

Test Equipment

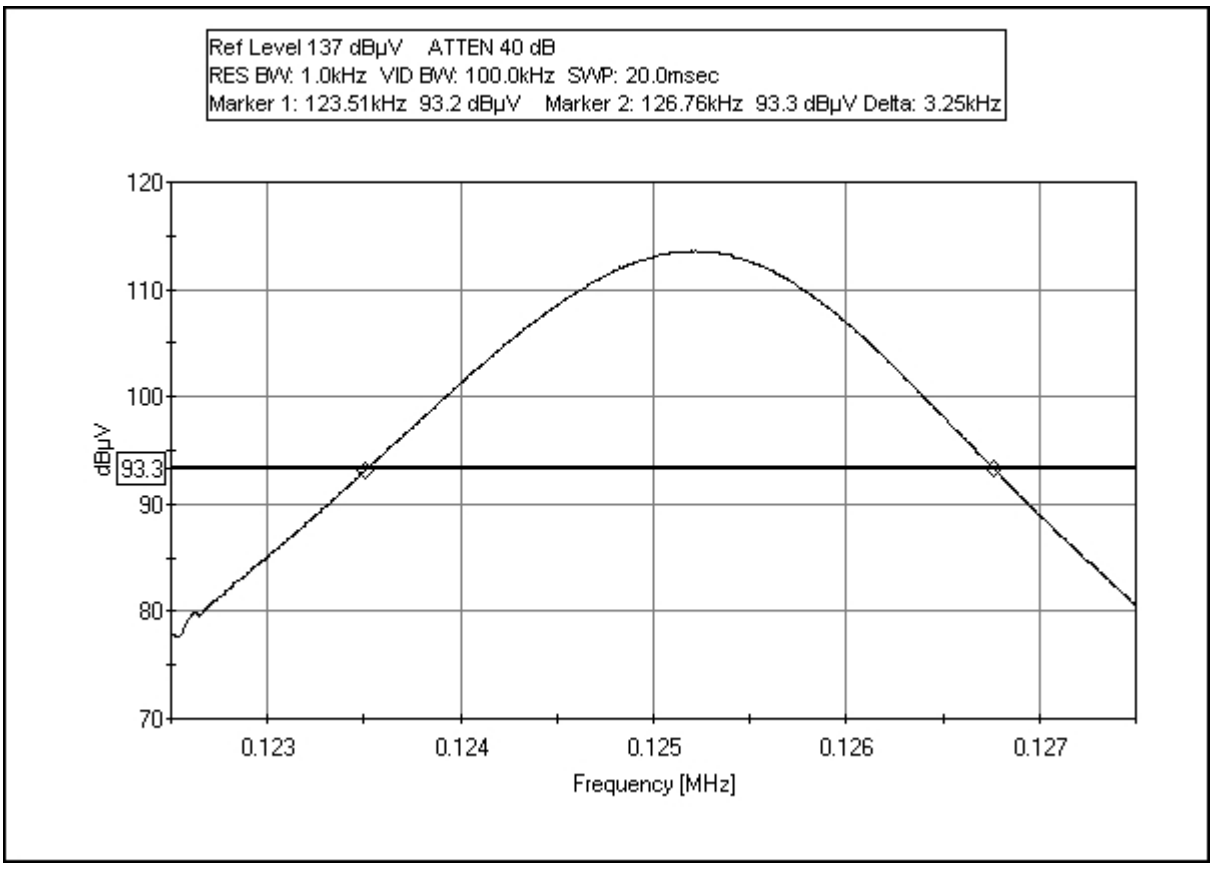
***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
QP Adapter	2811A01065	06/12/2008	06/12/2010	AN00707
HP Spectrum Analyzer	2634A02958	10/11/2007	10/11/2009	02305
SA Display	2403A06676	10/11/2007	10/11/2009	00684
Cable 30'	RG214 11	11/09/2006	11/09/2008	ANP05366
Cable 6'	RG214 49	11/09/2006	11/09/2008	ANP05371
Cable 6'	RG214 51	11/09/2006	11/09/2008	ANP05361
20' RG-214 Coax	S/N: 16	11/09/2006	11/09/2008	ANP05360
Mag Loop	2156	06/04/2008	06/04/2010	AN00052

Test Conditions: EUT is an RF Reader and it is located at the back edge of the table with its cable routed under the table to the interface box and then from that box to the outside of the chamber to the power supply. The antenna is 5 meters away from the EUT.

Test Setup Photos

Plots


Ref Level 137 dBµV ATTEN 40 dB
RES BW: 1.0kHz VID BW: 100.0kHz SWP: 20.0msec
Marker 1: 123.51kHz 93.2 dBµV Marker 2: 126.76kHz 93.3 dBµV Delta: 3.25kHz
120
110
100
dBµV
93.3
90
80
70
0.123
0.124
0.125
0.126
0.127
Frequency [MHz]