

ReelSonar

ADDENDUM TO TEST REPORT 94243-5

Bluetooth Ultrasonic Fish Finder Model: iBobber

Tested To The Following Standards:

FCC Part 15 Subpart C § 15.249

Report No.: 94243-5A

Date of issue: April 28, 2014



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

ReelSonar
2316 Eastlake Ave E
Seattle, WA 98102

Representative: Chris Doughty
Customer Reference Number: 14-004

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Morgan Tramontin
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 94243

February 24, 2014

February 24-March 4, 2014

April 18, 2014

Revision History

Original: Testing of the Bluetooth Ultrasonic Fish Finder, iBobber to FCC 15.249.

Addendum A: To replace data sheet and test plots in section 15.215(c) Occupied Bandwidth. To replace data sheet and test plots in section 15.249(a) Maximum Power Output. Replace data in Field Strength Spurious emissions and Band Edge section 15.249(d). Add Y and Z Axis photos to all test sections.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

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

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Bothell	US0081	SL2-IN-E-1145R	3082C-1	318736	A-0148

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure/Method	Description	Results
15.249(a)	Maximum Power Output	Pass
15.215(c)	Occupied Bandwidth	Pass
15.249(d)	Field Strength of Spurious Emissions and Band Edge	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Bluetooth Ultrasonic Fish Finder

Manuf: ReelSonar

Model: iBobber

Serial: E0-C7-9D-63-27-DE

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) CFR 47 Section 15 Subpart C requirements for Intentional Radiators.

15.249(a) Maximum Power Output

Test Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **ReelSonar**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **94243** Date: 4/18/2014
 Test Type: **Maximized Emissions** Time: 11:21:06
 Equipment: **Bluetooth Ultrasonic Fish Finder** Sequence#: 2
 Manufacturer: ReelSonar Tested By: Steven Pittsford
 Model: iBobber
 S/N: E0-C7-9D-63-27-DE

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06505	Cable	32026-29080-29080-84	10/18/2013	10/18/2015
T2	AN03209	Preamplifier	83051A	3/5/2013	3/5/2015
T3	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	9/16/2013	9/16/2015
T4	ANP05547	Cable	Heliac	9/7/2012	9/7/2014
T5	AN02872	Spectrum Analyzer	E4440A	7/19/2013	7/19/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth Ultrasonic Fish Finder*	ReelSonar	iBobber	E0-C7-9D-63-27-DE

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Temperature: 21°C
 Pressure: 101.9kPa
 Humidity: 34%

Vertical and Horizontal Polarizations X, Y & Z Axis investigated only worst reported.
 CISPR Bandwidths Used
 EUT is located on the top of the test table 80cm over the ground plane.
 EUT is continuously transmitting at Low, Mid and High Channels.

Low 2.402GHz Fundamental
 Med 2.440GHz Fundamental
 High 2.482GHz Fundamental

15.31(e) Fresh Battery Installed

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

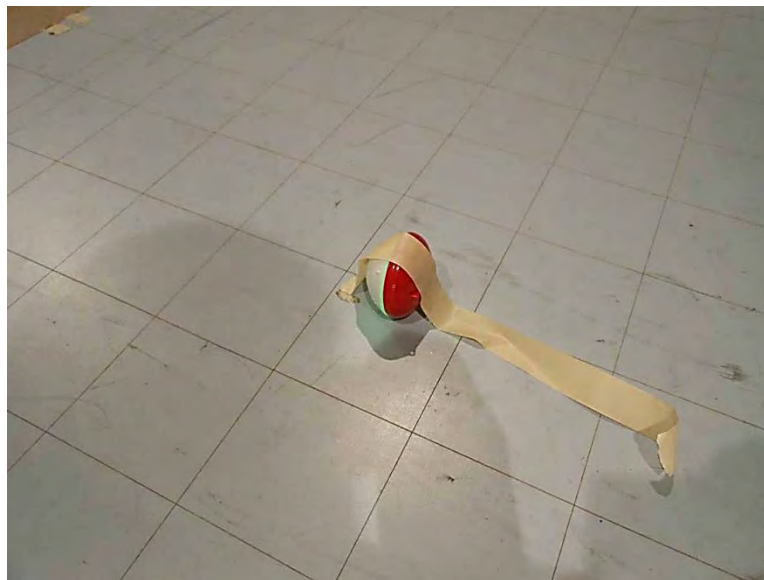
#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	2441.783M	91.0	+1.4 +0.0	-30.4	+28.0	+2.5	+0.0 355	92.5	94.0	-1.5	V & H 101
2	2402.000M	90.6	+1.4 +0.0	-30.4	+28.0	+2.5	+0.0 360	92.1	94.0	-1.9	V & H 101
3	2479.792M	89.9	+1.4 +0.0	-30.3	+27.9	+2.6	+0.0 343	91.5	94.0	-2.5	V & H 101

Test Setup Photo

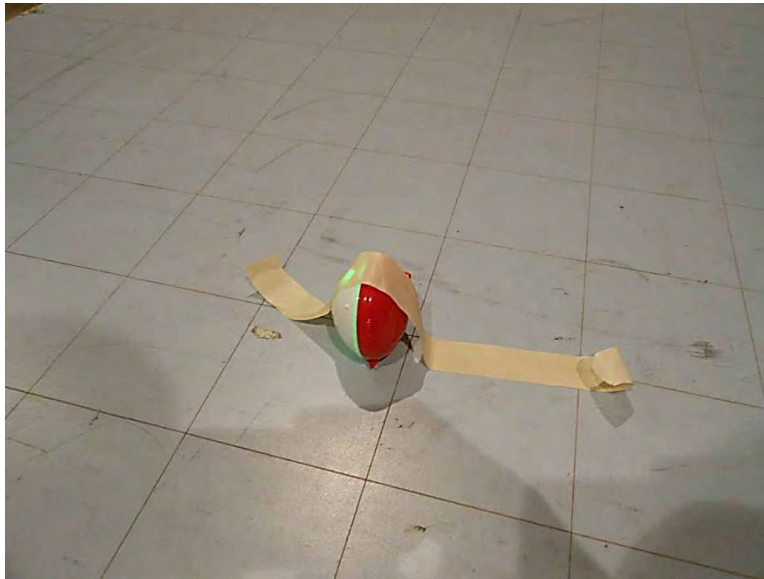
Note: Photo Timestamp Not Set – Photos taken day of testing (date of actual test) 03/04/2014.



Overall Test Setup



Y-Axis



Z-Axis

15.215(c) Occupied Bandwidth

Test Conditions / Setup

OBW FCC 15.215 (c)

-20dB occupied bandwidth

Work Order #:	94243	Date:	4/18/2014
Test Type:	Maximized Emissions	Time:	11:00
Equipment:	Bluetooth Ultrasonic Fish Finder		
Manufacturer:	ReelSonar	Tested By:	Steven Pittsford
Model:	iBobber		
S/N:	E0-C7-9D-63-27-DE		

Test Conditions:

Temp: 21°C

Humidity: 30%

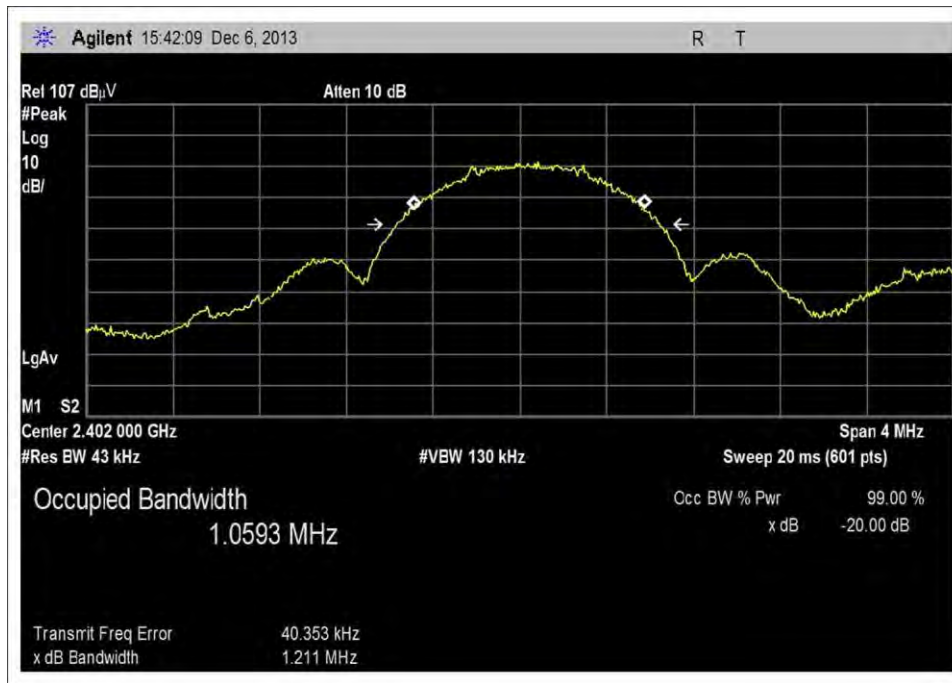
Pressure: 102.2kPa

EUT's antenna is non-removable, thus the data will be gathered through radiated measurements. EUT is located on top of a test table, 80cm over the ground plane. EUT is power with a fresh battery.

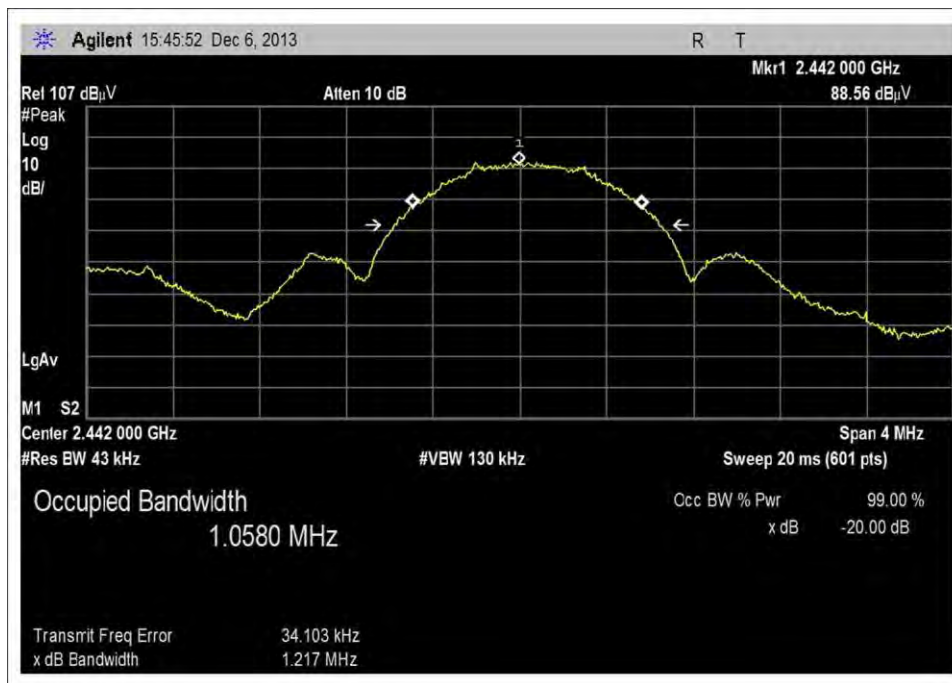
Test Equipment					
Asset #	Description	Model	Manufacturer	Cal Date	Cal Due
01467	Horn Antenna-ANSI C63.5 Calibration	3115	EMCO	9/16/2013	9/16/2015
03209	Preamp	83051A	Agilent	3/5/2013	3/5/2015
P05546	Cable	Heliac	Andrews	3/27/2013	3/27/2015
P06505	Cable	32026-29080-29080-84	Astrolab	10/18/2013	10/18/2015
02871	Spectrum Analyzer	E4440A	Agilent	7/19/2013	7/19/2015

Frequency (MHz)		-20dB Bandwidth			
2402		1.211MHz			
2442		1.217MHz			
2480		1.207MHz			

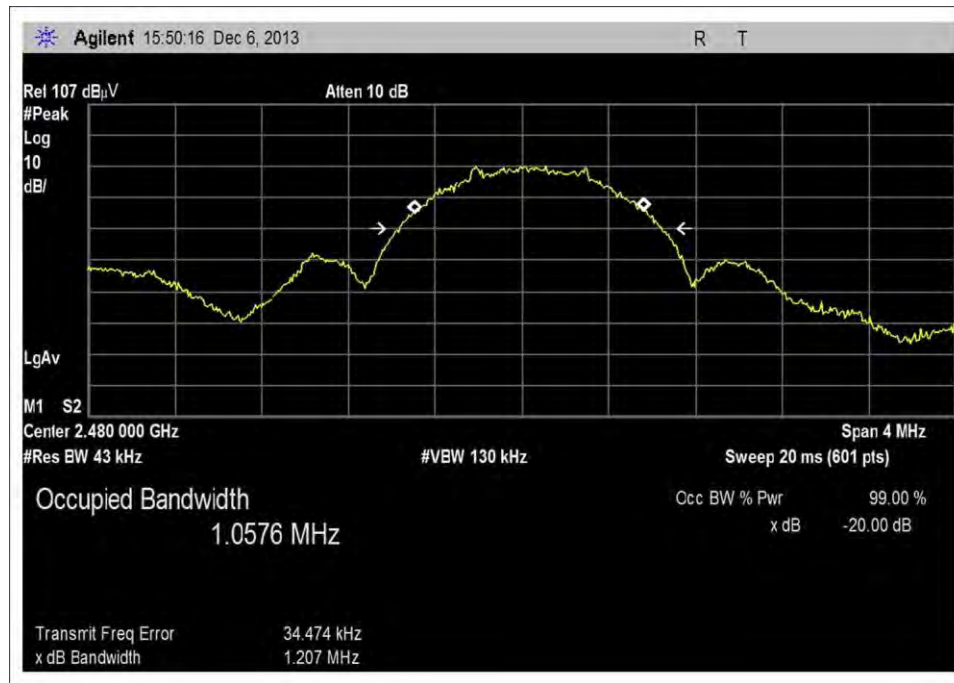
Test Data



Low



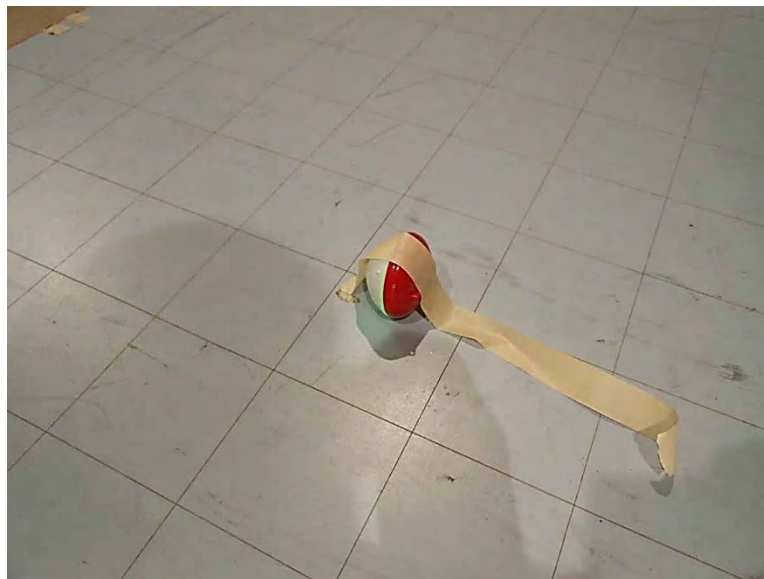
Middle



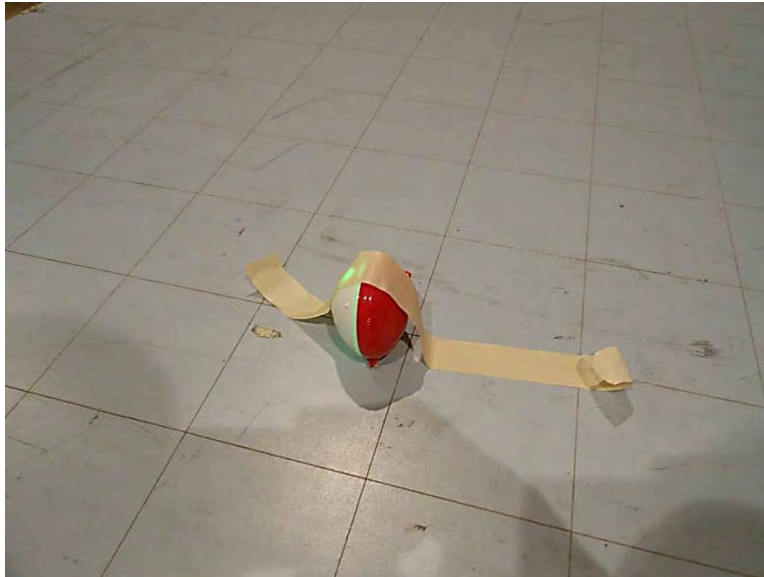
High

Test Photo(s)

Note: Photo Timestamp Not Set – Photos taken day of testing (date of actual test) 03/04/2014.



Y-Axis



X-Axis

15.249(d) Field Strength of Spurious Emissions and Band Edge

Test Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **ReelSonar**
 Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**
 Work Order #: **94243** Date: 2/24/2014
 Test Type: **Maximized Emissions** Time: 09:30:04
 Equipment: **Bluetooth Ultrasonic Fish Finder** Sequence#: 2
 Manufacturer: ReelSonar Tested By: Steven Pittsford
 Model: iBobber
 S/N: E0-C7-9D-63-27-DE

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06505	Cable	32026-29080-29080-84	10/18/2013	10/18/2015
T2	AN03209	Preamp	83051A	3/5/2013	3/5/2015
T3	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	9/16/2013	9/16/2015
T4	ANP05547	Cable	Heliac	9/7/2012	9/7/2014
T5	AN02872	Spectrum Analyzer	E4440A	7/19/2013	7/19/2015
T6	AN02308	Preamp	8447D	4/3/2012	4/3/2014
T7	AN01996	Biconilog Antenna	CBL6111C	3/2/2012	3/2/2014
T8	ANP05360	Cable	RG214	12/3/2012	12/3/2014
T9	ANP05541	Cable	Heliac	4/11/2012	4/11/2014
T10	AN00052	Loop Antenna	6502	5/16/2012	5/16/2014
T11	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	12/18/2012	12/18/2014
T12	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	12/17/2012	12/17/2014
T13	ANP05422	Cable	PE35591-72	6/8/2012	6/8/2014
T14	AN02763-69	Waveguide	Multiple	6/7/2012	6/7/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Bluetooth Ultrasonic Fish Finder*	ReelSonar	iBobber	E0-C7-9D-63-27-DE

Support Devices:

Function	Manufacturer	Model #	S/N
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Test Conditions / Notes:

Temperature: 21°C
Pressure: 101.9kPa
Humidity: 33%
Frequency: 9k-25GHz

Vertical and Horizontal Polarizations X, Y & Z Axis investigated only worst reported.
CISPR Bandwidths Used
EUT is located on the top of the test table 80cm over the ground plane.
EUT is continuously transmitting at Low, Mid and High Channels.

Low 2.402GHz Fundamental
Med 2.440GHz Fundamental
High 2.482GHz Fundamental

15.31(e) Fresh Battery Installed

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10 T14	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	9914.250M	32.8	+2.9 +0.0 +0.0 +0.0	-27.9 +0.0 +0.0 +0.0	+37.4 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0	50.1	54.0 High	-3.9	Horiz 118
2	9919.950M	32.5	+2.9 +0.0 +0.0 +0.0	-27.9 +0.0 +0.0 +0.0	+37.3 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 360	49.7	54.0 High	-4.3	Vert 118
3	7204.590M	34.1	+2.4 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+36.5 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0 +0.0	+0.0 294	49.1	54.0 Low	-4.9	Vert 119
4	9763.710M	31.6	+2.9 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+37.4 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 360	49.0	54.0 Mid	-5.0	Vert 112
5	7436.133M	32.4	+2.5 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+37.5 +0.0 +0.0 +0.0	+4.4 +0.0 +0.0 +0.0	+0.0	48.6	54.0 High	-5.4	Vert 119
6	7319.550M	32.5	+2.4 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+37.0 +0.0 +0.0 +0.0	+4.3 +0.0 +0.0 +0.0	+0.0	48.0	54.0 Mid	-6.0	Vert 107
7	4881.940M	39.9	+2.7 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+32.3 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0 +0.0	+0.0	47.6	54.0 Mid	-6.4	Vert 158

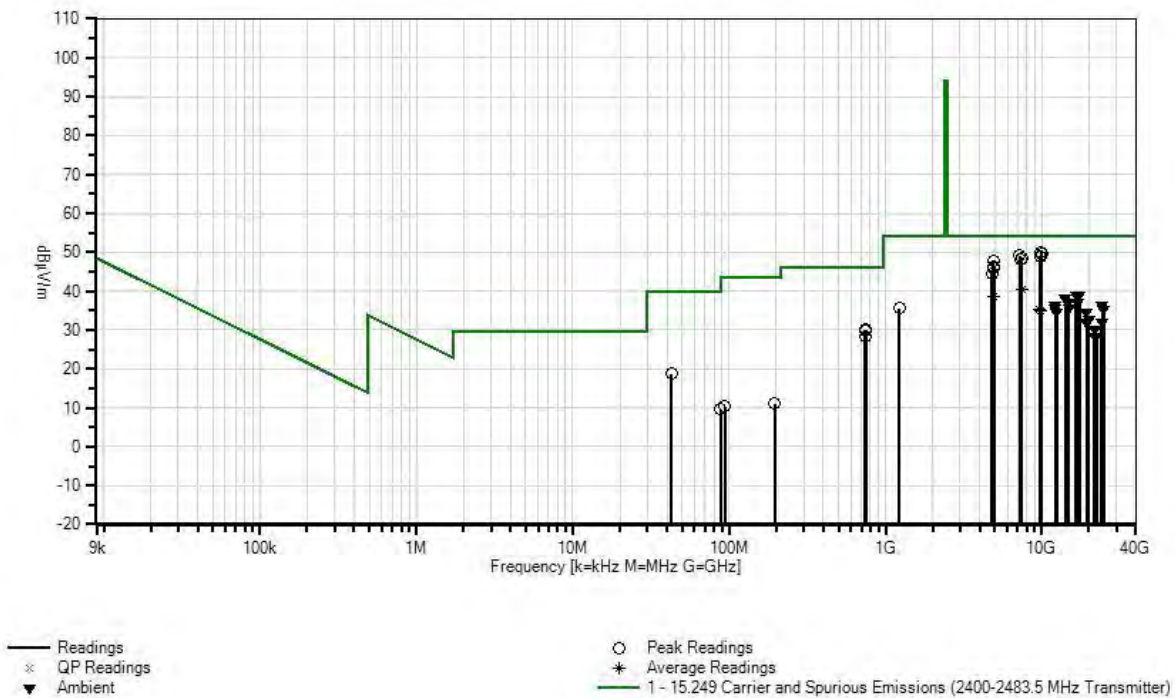
8	4958.267M	38.2	+2.6 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+32.5 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0 +0.0	+0.0 360	46.1	54.0 High	-7.9	Vert 110
9	4958.100M	37.9	+2.6 +0.0 +0.0 +0.0	-30.8 +0.0 +0.0 +0.0	+32.5 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0 +0.0	+0.0 14	45.8	54.0 High	-8.2	Horiz 131
10	4806.090M	37.4	+2.5 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+32.1 +0.0 +0.0 +0.0	+3.5 +0.0 +0.0 +0.0	+0.0	44.6	54.0 Low	-9.4	Horiz 135
11	4806.020M	37.1	+2.5 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+32.1 +0.0 +0.0 +0.0	+3.5 +0.0 +0.0 +0.0	+0.0 360	44.3	54.0 Low	-9.7	Vert 103
12	7436.133M Ave	24.1	+2.5 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+37.5 +0.0 +0.0 +0.0	+4.4 +0.0 +0.0 +0.0	+0.0 249	40.3	54.0 High	-13.7	Horiz 99
^	7436.133M	33.0	+2.5 +0.0 +0.0 +0.0	-28.2 +0.0 +0.0 +0.0	+37.5 +0.0 +0.0 +0.0	+4.4 +0.0 +0.0 +0.0	+0.0 360	49.2	54.0 High	-4.8	Horiz 117
14	16454.000 M Ambient	40.2	+4.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -11.6 +0.0	+6.4 +0.0 +0.0 +0.0	+0.0	39.0	54.0 Noise Floor	-15.0	V & H 101
15	17374.000 M Ambient	40.0	+4.2 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.2 +0.0	+6.9 +0.0 +0.0 +0.0	+0.0	38.9	54.0 Noise Floor	-15.1	V & H 101
16	4882.080M Ave	31.0	+2.7 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+32.3 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0 +0.0	+0.0 359	38.7	54.0 Mid	-15.3	Horiz 125
^	4882.030M	40.0	+2.7 +0.0 +0.0 +0.0	-30.9 +0.0 +0.0 +0.0	+32.3 +0.0 +0.0 +0.0	+3.6 +0.0 +0.0 +0.0	+0.0	47.7	54.0 Mid	-6.3	Horiz 125
18	14050.000 M Ambient	42.7	+4.6 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -15.2 +0.0	+6.1 +0.0 +0.0 +0.0	+0.0	38.2	54.0 Noise Floor	-15.8	V & H 101
19	743.200M	33.2	+0.8 +0.0 +1.0 +0.0	+0.0 -28.0 +0.0 +0.0	+0.0 +21.3 +0.0 +0.0	+0.0 +1.8 +0.0 +0.0	+0.0	30.1	46.0 Mid	-15.9	Vert 99
20	746.400M	33.0	+0.8 +0.0 +1.0 +0.0	+0.0 -28.0 +0.0 +0.0	+0.0 +21.3 +0.0 +0.0	+0.0 +1.8 +0.0 +0.0	+0.0	29.9	46.0 High	-16.1	Vert 99

21	17080.000 M Ambient	39.2	+4.3 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -12.8 +0.0	+6.6 +0.0	+0.0	37.3	54.0	-16.7	V & H 101
22	14640.000 M Ambient	42.1	+3.8 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -15.0 +0.0	+6.3 +0.0	+0.0	37.2	54.0	-16.8	V & H 101
23	742.400M	31.6	+0.8 +0.0 +1.0 +0.0	+0.0 -28.0 +0.0 +0.0	+0.0 +21.3 +0.0 +0.0	+0.0 +1.8 +0.0 +0.0	+0.0 360	28.5	46.0 Low	-17.5	Vert 114
24	24400.000 M Ambient	40.7	+0.0 +0.0 +0.0 +8.7	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 -13.1	+0.0 +0.0	+0.0	36.4	54.0	-17.6	V & H 101
25	12107.000 M Ambient	41.0	+3.6 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+5.6 +0.0	+0.0	36.3	54.0	-17.7	V & H 101
26	14892.000 M Ambient	40.5	+3.7 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.8 +0.0	+6.3 +0.0	+0.0	35.7	54.0	-18.3	V & H 101
27	12200.000 M Ambient	40.4	+3.5 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -13.9 +0.0	+5.7 +0.0	+0.0	35.7	54.0	-18.3	V & H 101
28	1225.400M	39.2	+1.0 +0.0 +0.0 +0.0	-30.7 +0.0 +0.0 +0.0	+24.4 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0 +0.0	+0.0 360	35.6	54.0 Low	-18.4	Vert 109
29	24820.000 M Ambient	38.9	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 -12.4	+0.0 +0.0	+0.0	35.3	54.0	-18.7	V & H 101
30	9613.470M Ave	17.8	+2.9 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+37.5 +0.0 +0.0 +0.0	+4.8 +0.0 +0.0 +0.0	+0.0 274	35.2	54.0 Low	-18.8	Vert 119
^	9613.470M	33.4	+2.9 +0.0 +0.0 +0.0	-27.8 +0.0 +0.0 +0.0	+37.5 +0.0 +0.0 +0.0	+4.8 +0.0 +0.0 +0.0	+0.0 310	50.8	54.0 Low	-3.2	Vert 119
32	9916.700M Ave	17.6	+2.9 +0.0 +0.0 +0.0	-27.9 +0.0 +0.0 +0.0	+37.3 +0.0 +0.0 +0.0	+4.9 +0.0 +0.0 +0.0	+0.0 111	34.8	54.0 High	-19.2	Horiz 118
33	19250.000 M Ambient	38.8	+0.0 +0.0 +0.0 +7.7	+0.0 +0.0 +0.0 +1.5	+0.0 +0.0 +0.0 -13.3	+0.0 +0.0	+0.0	34.7	54.0	-19.3	V & H 101

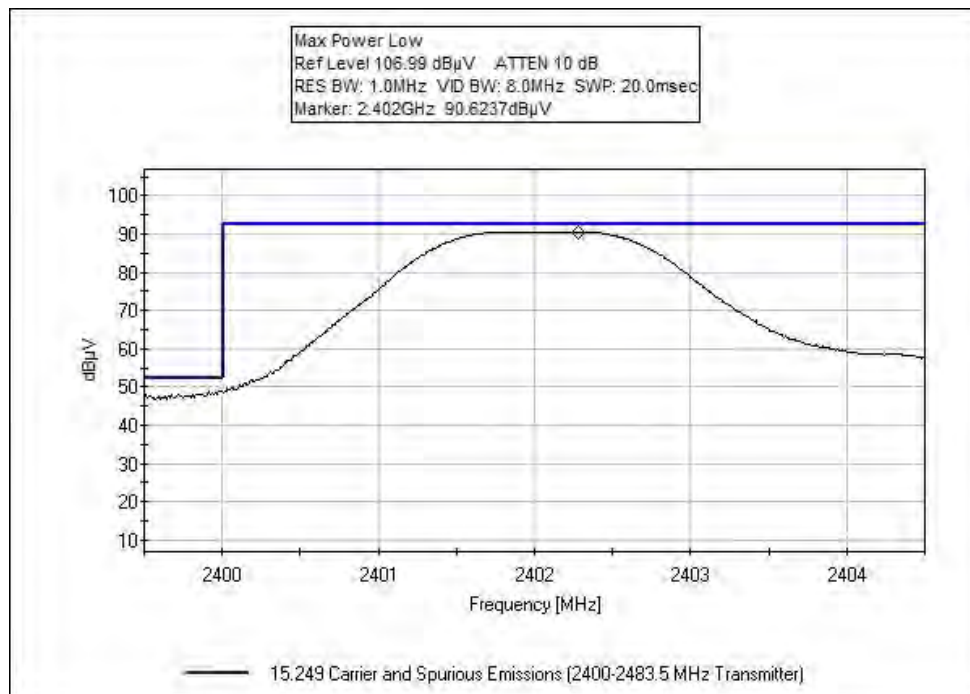
34	12410.000 M Ambient	39.4	+3.5 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 -14.1 +0.0	+5.7 +0.0 +0.0 +0.0	+0.0	34.5	54.0 Noise Floor	-19.5	V & H 101
35	42.750M	34.1	+0.2 +0.0 +0.3 +0.0	+0.0 -28.0 +0.0 +0.0	+0.0 +11.7 +0.0 +0.0	+0.0 +0.4 +0.0 +0.0	+0.0	18.7	40.0 Low	-21.3	Vert 99
36	19865.000 M Ambient	37.2	+0.0 +0.0 +0.0 +7.9	+0.0 +0.0 +0.0 +0.9	+0.0 +0.0 +0.0 -13.4	+0.0 +0.0 +0.0 -13.4	+0.0	32.6	54.0 Noise Floor	-21.4	V & H 101
37	19216.000 M Ambient	36.2	+0.0 +0.0 +0.0 +7.7	+0.0 +0.0 +0.0 +1.5	+0.0 +0.0 +0.0 -13.3	+0.0 +0.0 +0.0 -13.3	+0.0	32.1	54.0 Noise Floor	-21.9	V & H 101
38	24020.000 M Ambient	37.1	+0.0 +0.0 +0.0 +8.6	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 -13.9	+0.0 +0.0 +0.0 -13.9	+0.0	31.9	54.0 Noise Floor	-22.1	V & H 101
39	21960.000 M Ambient	37.9	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +0.2	+0.0 +0.0 +0.0 -16.4	+0.0 +0.0 +0.0 -16.4	+0.0	30.0	54.0 Noise Floor	-24.0	V & H 101
40	22338.000 M Ambient	36.9	+0.0 +0.0 +0.0 +8.3	+0.0 +0.0 +0.0 +0.1	+0.0 +0.0 +0.0 -16.8	+0.0 +0.0 +0.0 -16.8	+0.0	28.5	54.0 Noise Floor	-25.5	V & H 101
41	21618.000 M Ambient	35.6	+0.0 +0.0 +0.0 +8.2	+0.0 +0.0 +0.0 +0.3	+0.0 +0.0 +0.0 -15.8	+0.0 +0.0 +0.0 -15.8	+0.0	28.3	54.0 Noise Floor	-25.7	V & H 101
42	87.800M	28.1	+0.3 +0.0 +0.3 +0.0	+0.0 -28.0 +0.0 +0.0	+0.0 +8.2 +0.0 +0.0	+0.0 +0.6 +0.0 +0.0	+0.0 360	9.5	40.0 High	-30.5	Vert 99
43	196.430M	27.5	+0.4 +0.0 +0.5 +0.0	+0.0 -27.3 +0.0 +0.0	+0.0 +9.0 +0.0 +0.0	+0.0 +0.9 +0.0 +0.0	+0.0	11.0	43.5 Low	-32.5	Vert 99
44	93.920M	28.0	+0.3 +0.0 +0.3 +0.0	+0.0 -27.9 +0.0 +0.0	+0.0 +9.0 +0.0 +0.0	+0.0 +0.6 +0.0 +0.0	+0.0	10.3	43.5 Mid	-33.2	Vert 400
45	150.000k	48.2	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +9.5 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-80.0 360	-22.3	24.1 High	-46.4	Paral 99
46	150.000k	45.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +9.5 +0.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0 +0.0	-80.0 326	-24.6	24.1 Low	-48.7	Paral 99

47	150.000k	45.8	+0.0	+0.0	+0.0	+0.0	-80.0	-24.7	24.1	-48.8	Paral
			+0.0	+0.0	+0.0	+0.0			Mid		99
			+0.0	+9.5	+0.0	+0.0					
			+0.0	+0.0							
48	20.082k	43.6	+0.0	+0.0	+0.0	+0.0	-80.0	-24.0	41.5	-65.5	Paral
			+0.0	+0.0	+0.0	+0.0	36		Mid		99
			+0.0	+12.4	+0.0	+0.0					
			+0.0	+0.0							
49	17.673k	43.9	+0.0	+0.0	+0.0	+0.0	-80.0	-23.0	42.6	-65.6	Paral
			+0.0	+0.0	+0.0	+0.0	21		Low		99
			+0.0	+13.1	+0.0	+0.0					
			+0.0	+0.0							
50	15.831k	44.2	+0.0	+0.0	+0.0	+0.0	-80.0	-22.0	43.6	-65.6	Paral
			+0.0	+0.0	+0.0	+0.0			High		99
			+0.0	+13.8	+0.0	+0.0					
			+0.0	+0.0							

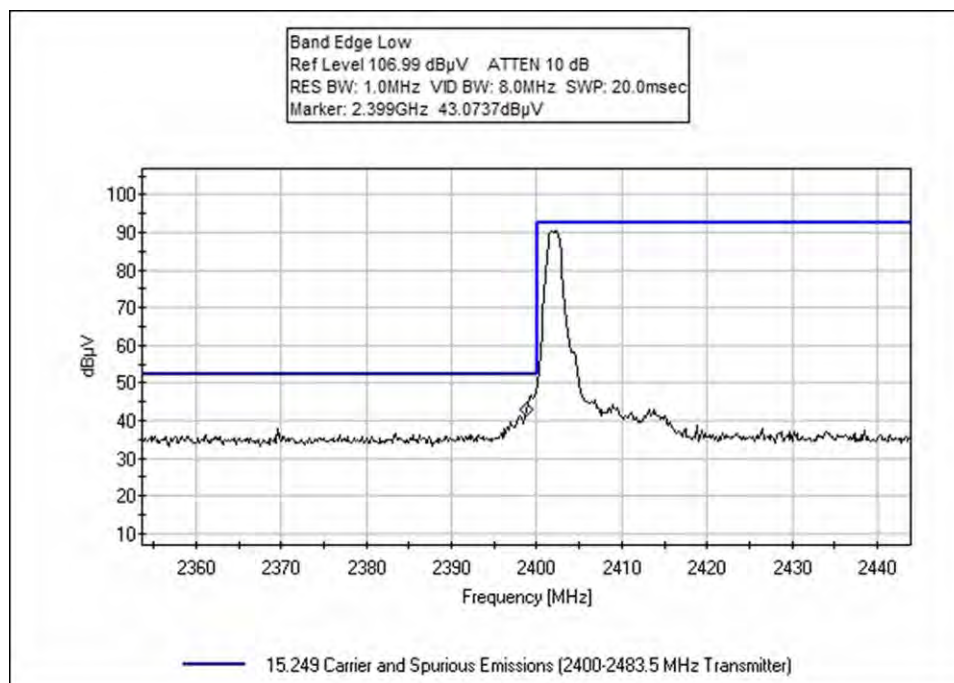
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ReelSonar Bluetooth Ultrasonic Fish Finder P/N: iBobber

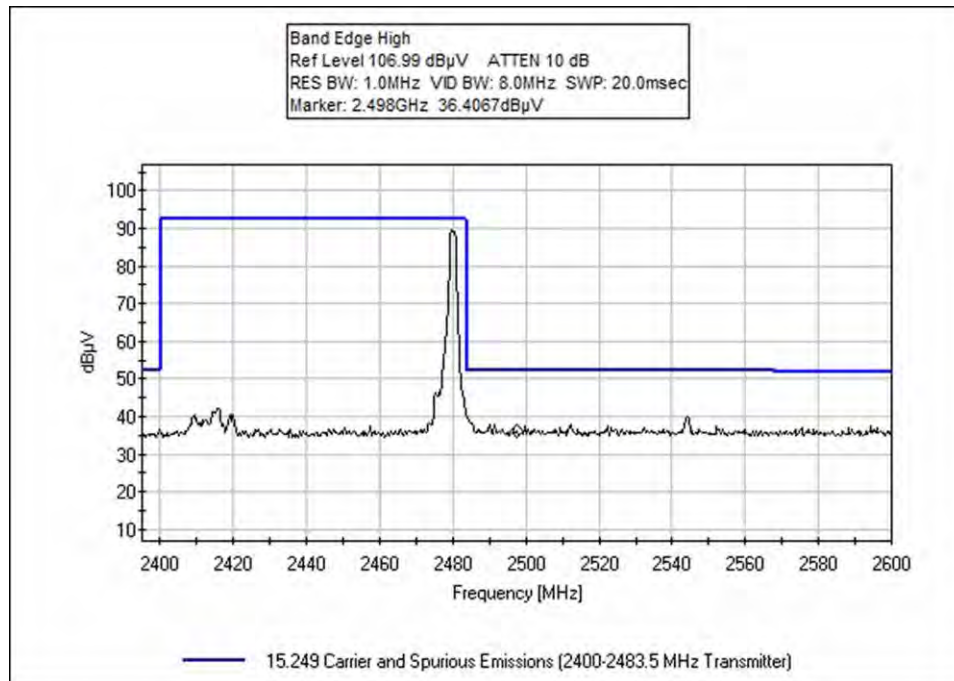


Band Edge Test Data



Low





High

Test Setup Photo(s)

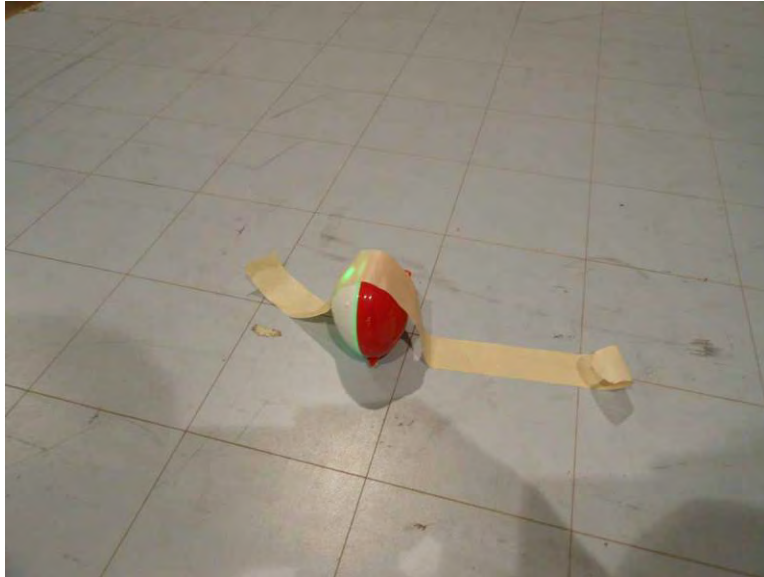
Note: Photo Timestamp Not Set – Photos taken day of testing (date of actual test) 03/04/2014.



Overall Test Setup



Y-Axis



Z-Axis

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: 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 dB μ V/m, the spectrum analyzer reading in dB μ V 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. Unless otherwise specified, 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.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED 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 "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. 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 or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent 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

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. 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.