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CERTIFICATION TEST REPORT

Report Number:	2009 05127346 POINTER REMOTE FCC 15.247
Project Number:	24623-1
Nex Number:	127346
Applicant:	FINDER TECHNOLOGIES INC. 14260 GRADEN ROAD SUITE A16 POWAY, CA 92064
Equipment Under Test (EUT):	RADIO DIRECTIONAL FINDER
Model:	COMPASS AUTO-FINDER POINTER REMOTE
FCC ID:	XDJ-PNTRREM-01
In Accordance With:	FCC Part 15 Subpart C, 15.247
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Authorized By:	 Alan Laudani, EMC/RF Test Engineer
Date:	May 18, 2009
Total Number of Pages:	27

Section1: Summary of Test Results

General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

Apparatus Assessed:	Radio Directional Finder
Model:	Compass Auto-Finder Pointer Remote
Serial:	0003
Specification:	FCC Part 15 Subpart C, 15.247l
Date Received in Laboratory:	April 27, 2009
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.1 Report Release History

REVISION	DATE	COMMENTS
-	May 18, 2009	Prepared By: Ferdinand Custodio
-	May 18, 2009	Initial Release: Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY: _____ Date: May 18, 2009
Ferdinand Custodio, EMC Test Engineer

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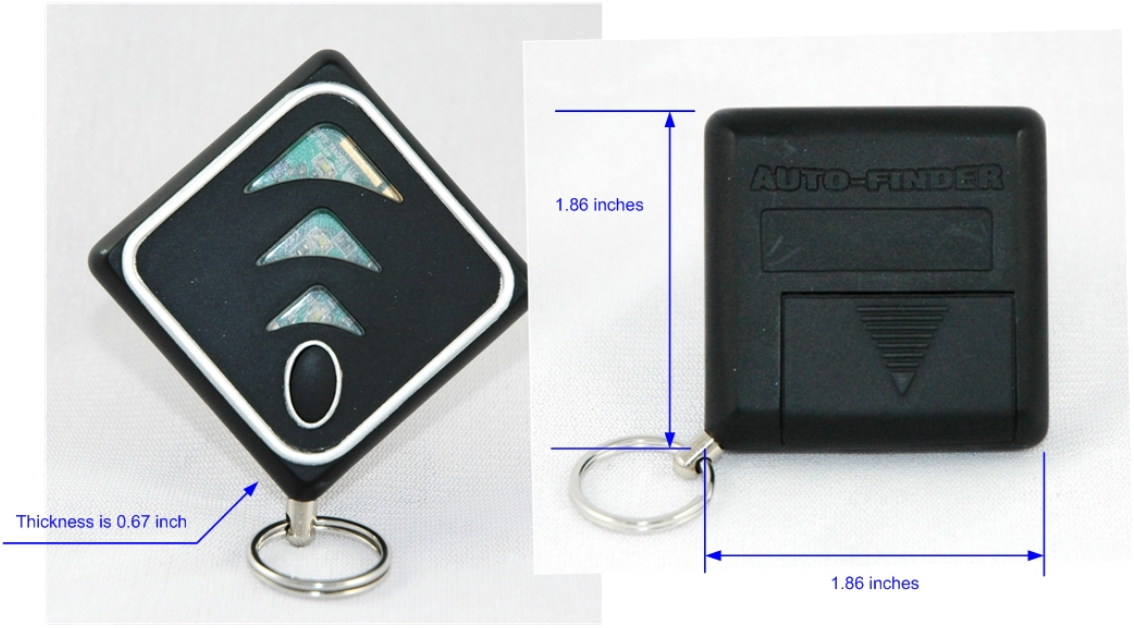
Section 2: Equipment Under Test

2.1 Product Identification

The Equipment Under Test was indentified as follows:

FINDER TECHNOLOGIES INC. COMPASS AUTO-FINDER POINTER REMOTE SN 0003



2.2 Samples Submitted for Assessment

The following sample of the apparatus has been submitted for type assessment:

Sample No.	Description	Serial No.
127346-2	COMPASS AUTO-FINDER POINTER REMOTE	0003

2.3 Theory of Operation

The Compass Auto-Finder Pointer Remote is part of the Compass Auto-Finder system. The Auto-Finder is an advanced radio directional finder consisting of two transceivers. Each Auto-Finder comes with a Pointer Remote (EUT - hand-held unit) that contains one of the world's smallest directional antennas, and an in-car Beacon that contains a proprietary dual antenna system. At rest, the Beacon is in an intermittent sleep mode, waiting for an activation signal from the Pointer Remote. When locating a vehicle, pressing and holding the locate button on the Pointer Remote wakes up the Beacon. Within 3 to 5 seconds the Beacon the Pointer Remote enters the search mode. The user can then locate the direction of his/her vehicle by using the audio tones and LED lights on the Pointer Remote.

2.4 Technical Specifications of the EUT

Manufacturer:	Finder Technologies Inc.
Operating Frequency:	2405 MHz in the 2400-2483.5 MHz Band
Number of Operating Frequencies:	1
Rated Power:	114.8 dBµV/m @ 3 m
Modulation:	O-QPSK
Antenna Connector:	Internal/Integral
Power Source:	12VDC (2X 27A Batteries in parallel)

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247
Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

3.2 Deviations from Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	18 ^{o}C
Humidity range	:	88 %
Pressure range	:	102 kPa
Power supply range	:	4.5VDC (Batteries)

3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
128	Antenna, Bicon	EMCO	3104	2882	09-Feb-09	09-Feb-11
752	Antenna, DRWG	EMCO	3115	4943	12-Nov-08	12-Nov-10
317	Preamplifier	HP	8449A	2749A00167	16-Apr-09	16-Apr-10
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	28-Jul-08	28-Jul-10
111	Antenna, LPA	EMCO	3146	1382	20-Oct-08	20-Oct-10
911	Spectrum Analyzer	Agilent	E4440A	US41421266	06-Nov-08	06-Nov-09

2040B-1 OATS

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

No Tests were deleted from this assessment.

4.5 Additional Observations

There were no additional observations made during this assessment.

Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: Test Results
§ 15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1 Test Results

Part 15C	Test Description	Required	Result
15.207	Transmitter and Receiver AC Power Lines Conducted Emission Limit	N	-
15.247 (d)	Spurious Emissions (Radiated Emission Test)	Y	Pass
15.247(a)(2)	Minimum 6dB RF Bandwidth	Y	Pass
15.247 (d)	Spurious Emissions (Radiated Emission Test)	Y	Pass
15.247(b)(3)	Maximum peak output power of systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands	Y	Pass
15.247(e)	Power Spectral Density for Digitally Modulated Devices	Y	Pass

Appendix A: Test Results

Section 15.247 (d) – Spurious Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	Compass Auto-Finder Pointer Remote	**Temperature:**	18°C
Date:	May 13, 2009	**Humidity:**	88%
Modification State:		**Tester:**	FSCustodio
		Laboratory:	SOATS

Test Results:

See attached plots.

Additional Observations:

- Emissions were searched over a range of 30 MHz to 25000 MHz while in transmit mode. No other emissions found within 20 dB of the limit.
- Investigations were made at 3 meters. The EUT was maximized in the OATS in three axis.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies while preamp was used for spurious emissions including harmonics, example below.
- Limit for spurious emissions not in restricted bands are 20dB below the maximum fundamental measurement using 100kHz RBW.
- Average = Peak Measurement + Duty Cycle Correction Factor
- Measurements were made after fresh batteries were installed.
- Sample Computation:

Correction factor @ 2405MHz = 34.2
= Antenna factor + Cable loss – Preamp gain
= 28.3 + 5.9 – 0

Corrected reading = Max. reading + Correction factor
= 80.6 + 34.2
= 114.8 dBµV/m

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Radiated Emissions Data

Job # :	24623-1	Date :	5/13/2009	Page 1 of 1	
NEX #:	127346	Time :	12:30PM		
		Staff :	FSC		
Client Name :	Finder Technologies, Inc.			EUT Voltage :	Battery
EUT Name :	Radio Directional Finder			EUT Frequency :	
EUT Model # :	Compass Auto Finder - Pointer Remote			Phase:	1
EUT Serial # :	0003			NOATS	
EUT Config. :	Transmit @ max power			SOATS	X
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	18		
Log Ant.#:	111_3m	Humidity (%) :	88		
DRG Ant. #	877	Spec An.#:	911		
Cable LF#:	SOATS	Spec An. Display #:	911		
Cable HF#:	40ft	QP #:	911		
Preamp LF#:	NA	PreSelect#:	NA		
Preamp HF#	317	Duty Cycle Factor#:	-20		

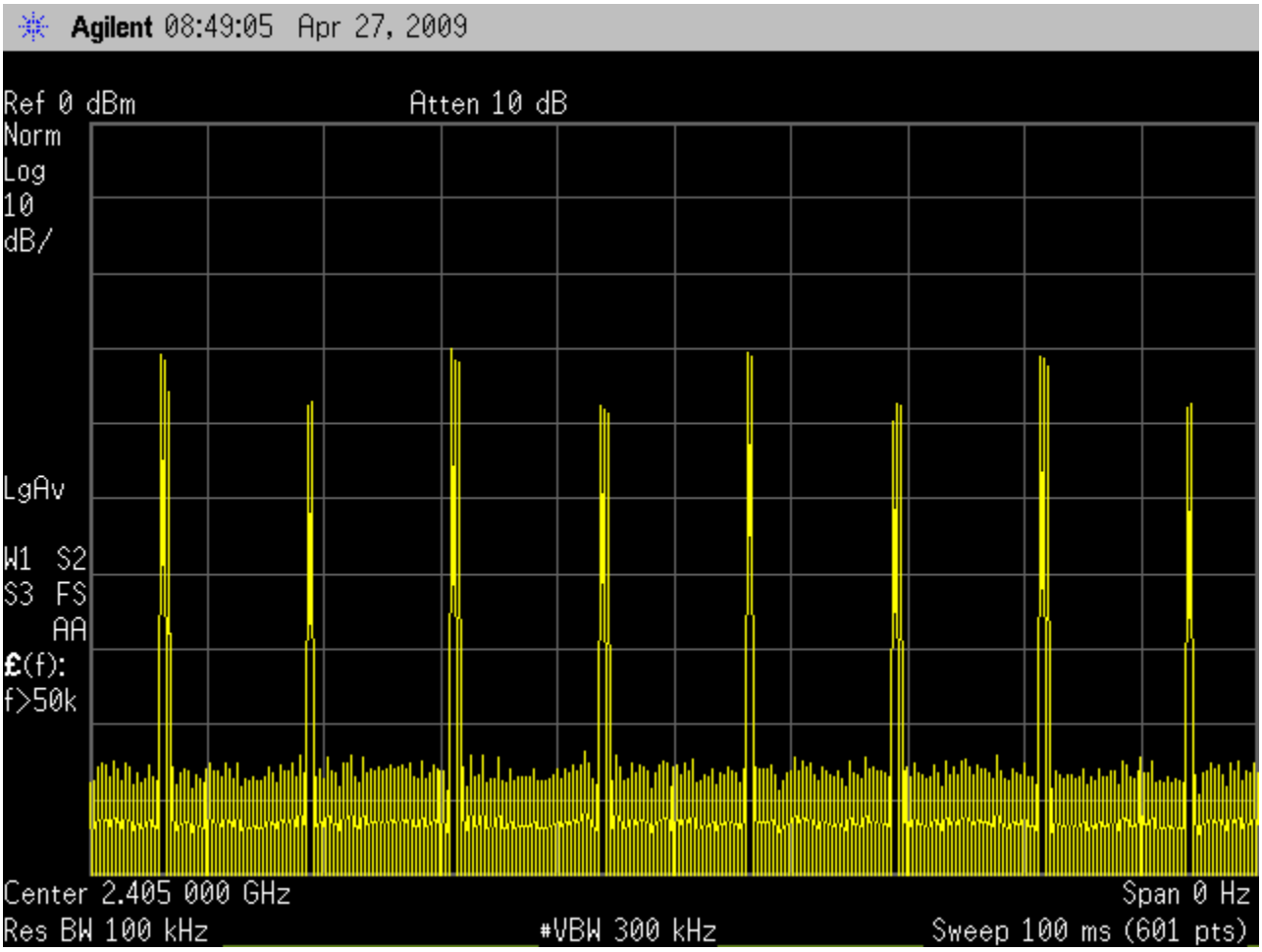
Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak (Fund.)	RBW:	3 MHz
	Video Bandwidth	9 MHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

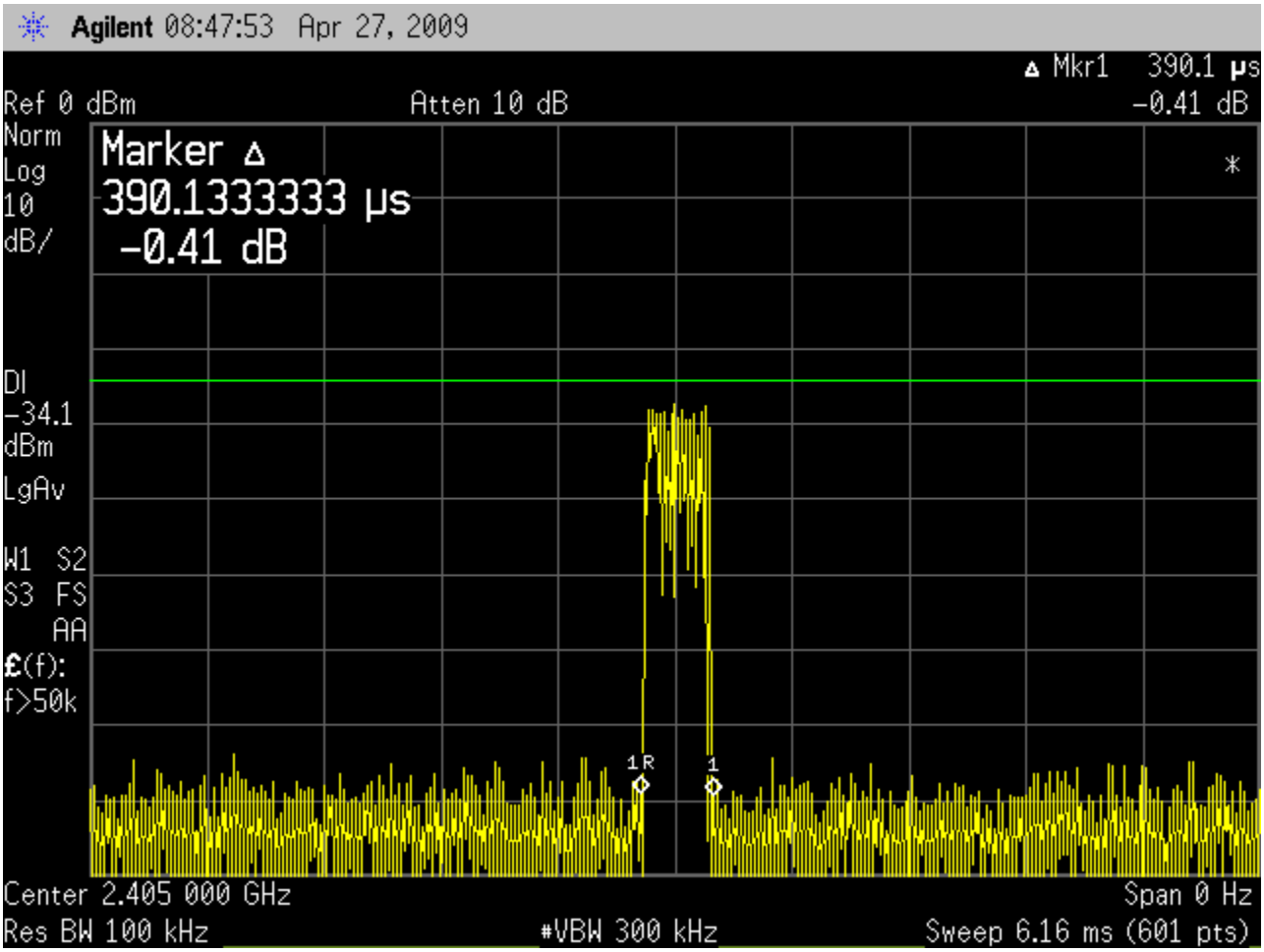
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2405.0	75.4	73.0	P	R	1.0	75.4	109.6	125.3	-15.7	Pass	X
2405.0	80.6	71.8	P	R	1.0	80.6	114.8	125.3	-10.5	Pass	Y
2405.0	75.5	70.6	P	B	1.0	75.5	109.7	125.3	-15.6	Pass	Z
2405.0	77.1	67.2	P	R	1.0	77.1	111.3	127.3	-16.0	Pass	at 100kHz RBW
2400.0	30.5	23.8	P	R	1.0	30.53	64.7	91.3	-26.6	Pass	at 100kHz RBW
2400.0	10.5	3.8	A	R	1.0	10.53	44.7	71.3	-26.6	Pass	
2483.5	36.1	35.4	P	R	1.0	36.12	34.3	74.0	-39.7	Pass	
2483.5	16.1	15.4	A	R	1.0	16.12	14.3	54.0	-39.7	Pass	
4810.0	65.3	65.8	P	R	1.0	65.83	70.8	74.0	-3.1	Pass	
4810.0	45.3	45.8	A	R	1.0	45.83	50.8	54.0	-3.1	Pass	
7215.0	57.0	55.3	P	R	1.0	57	71.8	74.0	-2.2	Pass	
7215.0	37.0	35.3	A	R	1.0	37	51.8	54.0	-2.2	Pass	
9620.0	47.4	48.3	P	R	1.0	48.27	67.4	74.0	-6.6	Pass	
9620.0	27.4	28.3	A	R	1.0	28.27	47.4	54.0	-6.6	Pass	
12025.0	46.6	46.6	P	R	1.0	46.62	71.2	74.0	-2.8	Pass	Noise Floor
12025.0	26.6	26.6	A	R	1.0	26.62	51.2	54.0	-2.8	Pass	Noise Floor

Duty Cycle Factor



8 emissions in 100ms



0.390 ms per emission

Duty Cycle Correction Factor computation:

= 0.390 x 8
= 3.12 ms or 3.12%
= 20 x log(0.0312)
= -30.11
= -20 dB (maximum allowed)

Section 15.247(a)(2) – Minimum 6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Conditions:

Sample Number:	Compass Auto-Finder Pointer Remote	**Temperature:**	18°C
Date:	April 27, 2009	**Humidity:**	88%
Modification State:		**Tester:**	FSCustodio
		Laboratory:	SOATS

Test Results:

See attached plots

Additional Observations:

- Measurements were made at 3 meters. The EUT was investigated and maximized in the OATS before the reading was made. Analyzer RES BW was set to 100 kHz. The spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was plotted; a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Frequency	6 dB Bandwidth
2405 MHz	1.65 MHz

Section 15.247(d) – Radiated Emissions within Restricted Bands

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	Compass Auto-Finder Pointer Remote	**Temperature:**	18°C
Date:	May 7, 2009	**Humidity:**	88%
Modification State:		**Tester:**	FSCustodio
		Laboratory:	SOATS

Test Results:

See attached plots.
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Additional Observations:

- Radiated Measurements below 1GHz were performed at 3m with a Quasi-Peak detector (RBW 120kHz/VBW 300kHz) while Radiated Peak (RBW 1MHz/VBW 3MHz) measurements conducted above 1GHz.
- The device has an integral antenna with no conducted emissions measurement capability.
- Emissions were searched over a range of 30 MHz to 25000 MHz while in transmit mode. No other emissions found within 20 dB of the limit.
- Investigations were made at 3 meters. The EUT was maximized in the OATS in three axis.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies while preamp was used for spurious emissions including harmonics, example below.
- Average = Peak Measurement + Duty Cycle Correction Factor
- Measurements were made after fresh batteries were installed.
- Bandedge plots presented are direct measurements. Antenna factor, cable loss and preamp gain are applied automatically by the radiated emission spreadsheet. See sample computation below.

- Sample Computation:

Correction factor @ 2483.5MHz	= -1.8
	= Antenna factor + Cable loss – Preamp gain
	= 28.3 + 5.9 – 36
Corrected reading	= Max. reading + Correction factor
	= 36.12 + (-1.8)
	= 34.32 dBµV/m

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Radiated Emissions Data

Job # :	24623-1	Date :	5/13/2009	Page 1 of 1	
NEX #:	127346	Time :	12:30PM		
		Staff :	FSC		
Client Name :	Finder Technologies, Inc.			EUT Voltage :	Battery
EUT Name :	Radio Directional Finder			EUT Frequency :	
EUT Model # :	Compass Auto Finder - Pointer Remote			Phase:	1
EUT Serial # :	0003			NOATS	
EUT Config. :	Transmit @ max power			SOATS	X
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B				
Loop Ant. #:	NA				
Bicon Ant.#:	128_3m	Temp. (°C) :	18		
Log Ant.#:	111_3m	Humidity (%) :	88		
DRG Ant. #	877	Spec An.#:	911		
Cable LF#:	SOATS	Spec An. Display #:	911		
Cable HF#:	40ft	QP #:	911		
Preamp LF#:	NA	PreSelect#:	NA		
Preamp HF#	317	Duty Cycle Factor#:	-20		

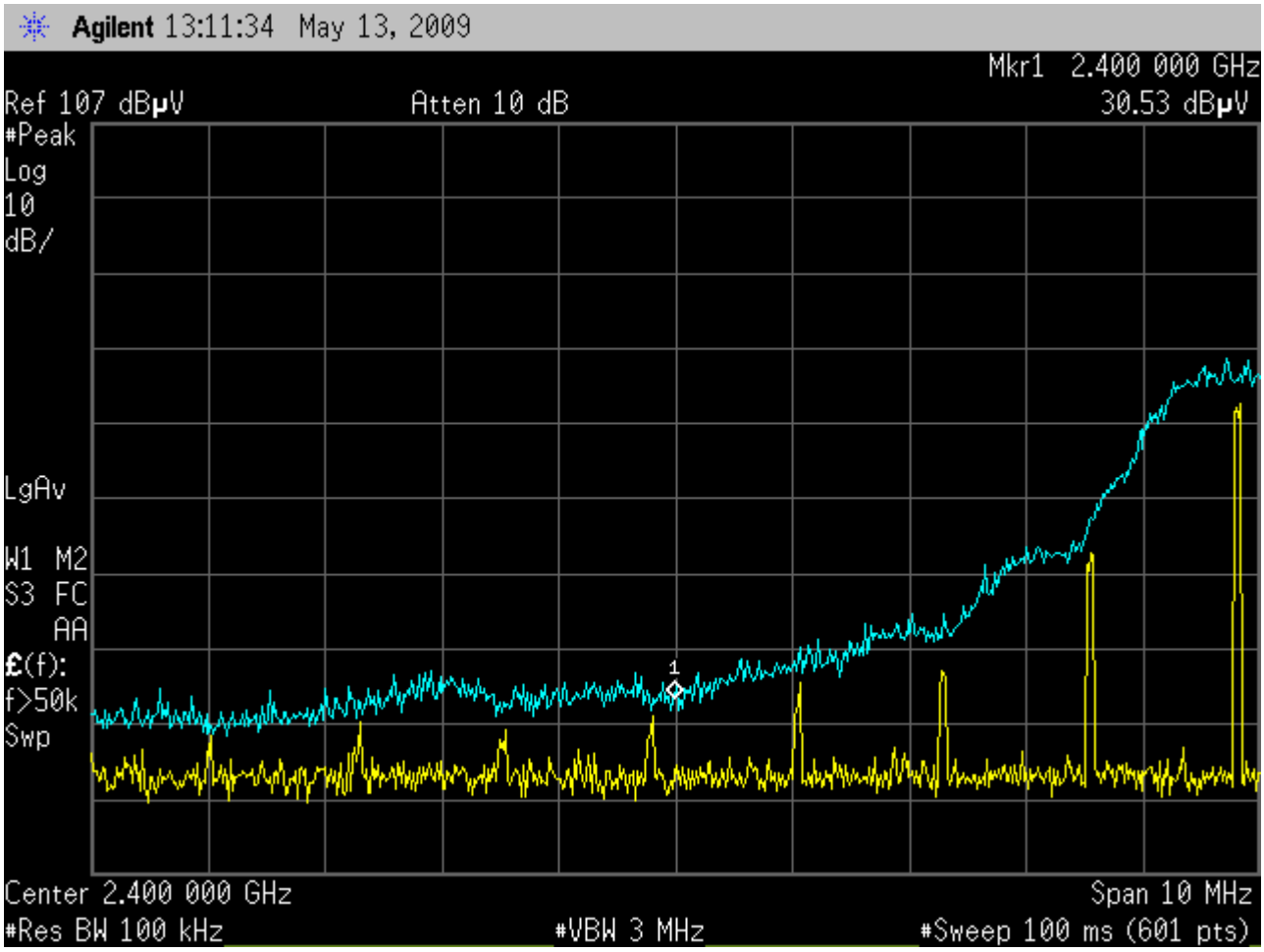
Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak (Fund.)	RBW:	3 MHz
	Video Bandwidth	9 MHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

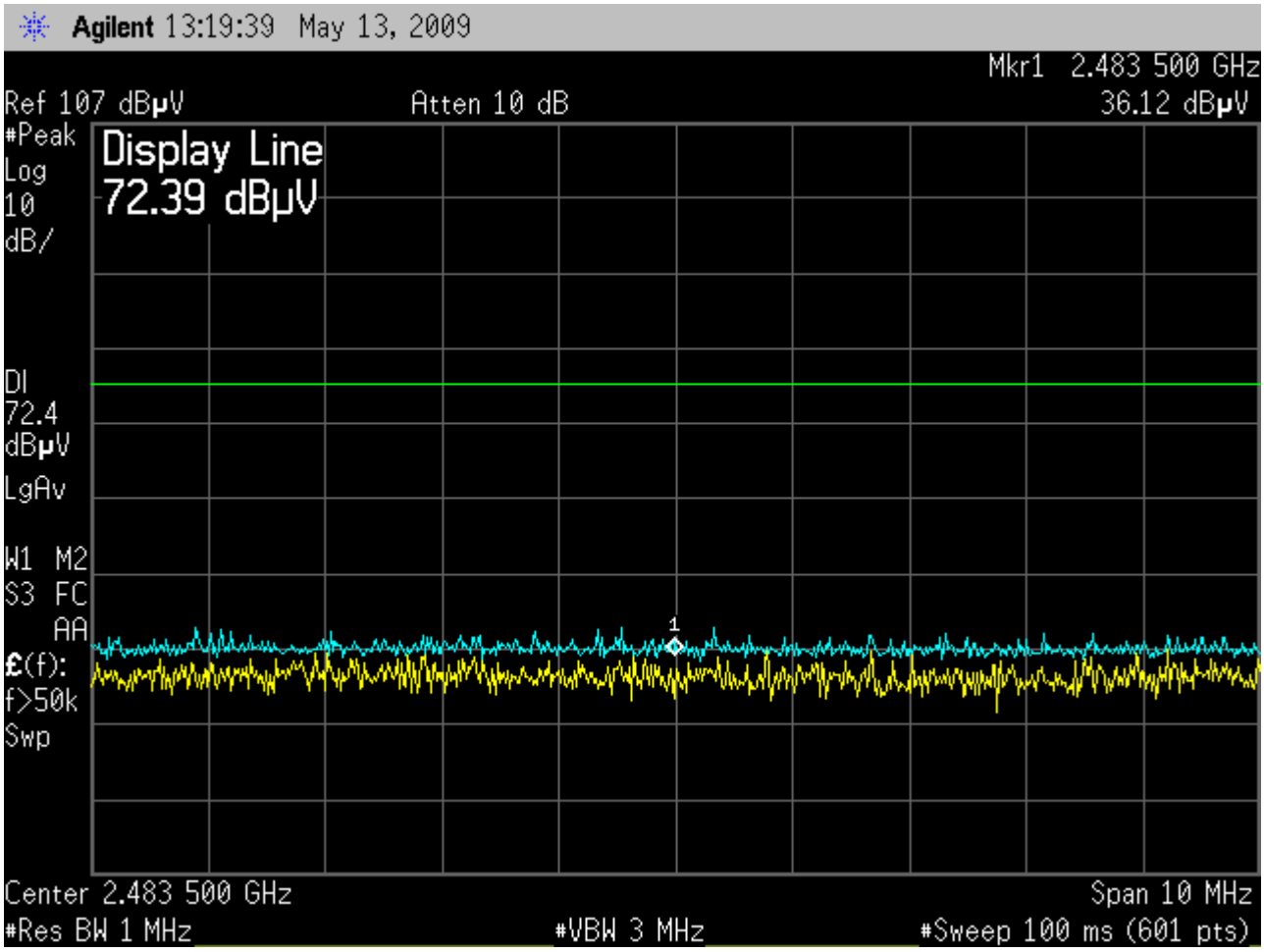
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2405.0	75.4	73.0	P	R	1.0	75.4	109.6	125.3	-15.7	Pass	X
2405.0	80.6	71.8	P	R	1.0	80.6	114.8	125.3	-10.5	Pass	Y
2405.0	75.5	70.6	P	B	1.0	75.5	109.7	125.3	-15.6	Pass	Z
2405.0	77.1	67.2	P	R	1.0	77.1	111.3	127.3	-16.0	Pass	at 100kHz RBW
2400.0	30.5	23.8	P	R	1.0	30.53	64.7	91.3	-26.6	Pass	at 100kHz RBW
2400.0	10.5	3.8	A	R	1.0	10.53	44.7	71.3	-26.6	Pass	
2483.5	36.1	35.4	P	R	1.0	36.12	34.3	74.0	-39.7	Pass	
2483.5	16.1	15.4	A	R	1.0	16.12	14.3	54.0	-39.7	Pass	
4810.0	65.3	65.8	P	R	1.0	65.83	70.8	74.0	-3.1	Pass	
4810.0	45.3	45.8	A	R	1.0	45.83	50.8	54.0	-3.1	Pass	
7215.0	57.0	55.3	P	R	1.0	57	71.8	74.0	-2.2	Pass	
7215.0	37.0	35.3	A	R	1.0	37	51.8	54.0	-2.2	Pass	
9620.0	47.4	48.3	P	R	1.0	48.27	67.4	74.0	-6.6	Pass	
9620.0	27.4	28.3	A	R	1.0	28.27	47.4	54.0	-6.6	Pass	
12025.0	46.6	46.6	P	R	1.0	46.62	71.2	74.0	-2.8	Pass	Noise Floor
12025.0	26.6	26.6	A	R	1.0	26.62	51.2	54.0	-2.8	Pass	Noise Floor

Lower Bandedge Measurements Plots (2400MHz)



Upper Bandedge Measurements Plots (2483.5MHz)



Section 15.247(b)(3) – Power Output (Radiated Emission Test)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

Test Conditions:

Sample Number:	Compass Auto-Finder Pointer Remote	**Temperature:**	18°C
Date:	May 7, 2009	**Humidity:**	88%
Modification State:		**Tester:**	FSCustodio
		Laboratory:	SOATS

Test Results:

See table.

Additional Observations:

- Investigations were made at 3 meters. The EUT was investigated and maximized in the OATS. Analyzer RES BW was set to 3 MHz and VBW to 9 MHz for fundamental power level measurements.
- A correction factor of 34.2 dB was added to compensate for antenna factor and cable loss at the fundamental frequencies.
- Measurements were made after fresh batteries were installed.
- Antenna gain: 1 dBi
- The peak level measured was converted to mW using the formula:

$$P = (E \times d)^2 / (30 \times G)$$

Where: **P** is power in watts
E is measured maximum field strength in V/m
D is measurement distance
G is numeric gain of the transmitting antenna over an isotropic radiator

Convert maximum reading in dBµV/m to V/m:

E = $10^{((dB\mu V/m\ -120)/20)}$
= $10^{((114.8-120)/20)}$
= 0.54954 V/m

Convert dB gain to numeric gain:

G = $10^{(G/10)}$
= $10^{(1/10)}$
= 1.2589

Going back to the original formula:

P = $(0.54954 \times 3)^2 / (30 \times 1.2589)$
= **0.07196 watts**

Converting watts to dBm:

P = 10 log (0.07196) + 30
= **18.57**

Channel	Frequency (MHz)	Measured Output Power (dBµV/m)	Measured Output Power (mW)	Measured Output Power (dBm)
-	2405	114.8	71.96	18.57

Section 15.247(e) – Power Spectral Density

15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Conditions:

Sample Number:	Compass Auto-Finder Pointer Remote	Temperature:	18°C
Date:	May 7, 2009	Humidity:	88%
Modification State:		Tester:	FSCustodio
		Laboratory:	SOATS

Test Results:

See attached plots.

Additional Observations:

- Measurements were made at 3 meters. The EUT was investigated and maximized in the OATS before any reading was made.
- Analyzer RES BW was set to 3 kHz and the Span was set to 1.5 MHz. Sweep was 500 seconds For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier.
- Measurements were made after fresh batteries were installed.
- Peak level obtained after the 500-second sweeps are compared to the +8 dBm limit.

Frequency (MHz)	RF Field Strength(dBµV/m)	Calculated PSD @ 1 dBi gain (dBm)	Maximum Limit (dBm)	Pass/Fail
2405	98.91	2.67	8	Pass

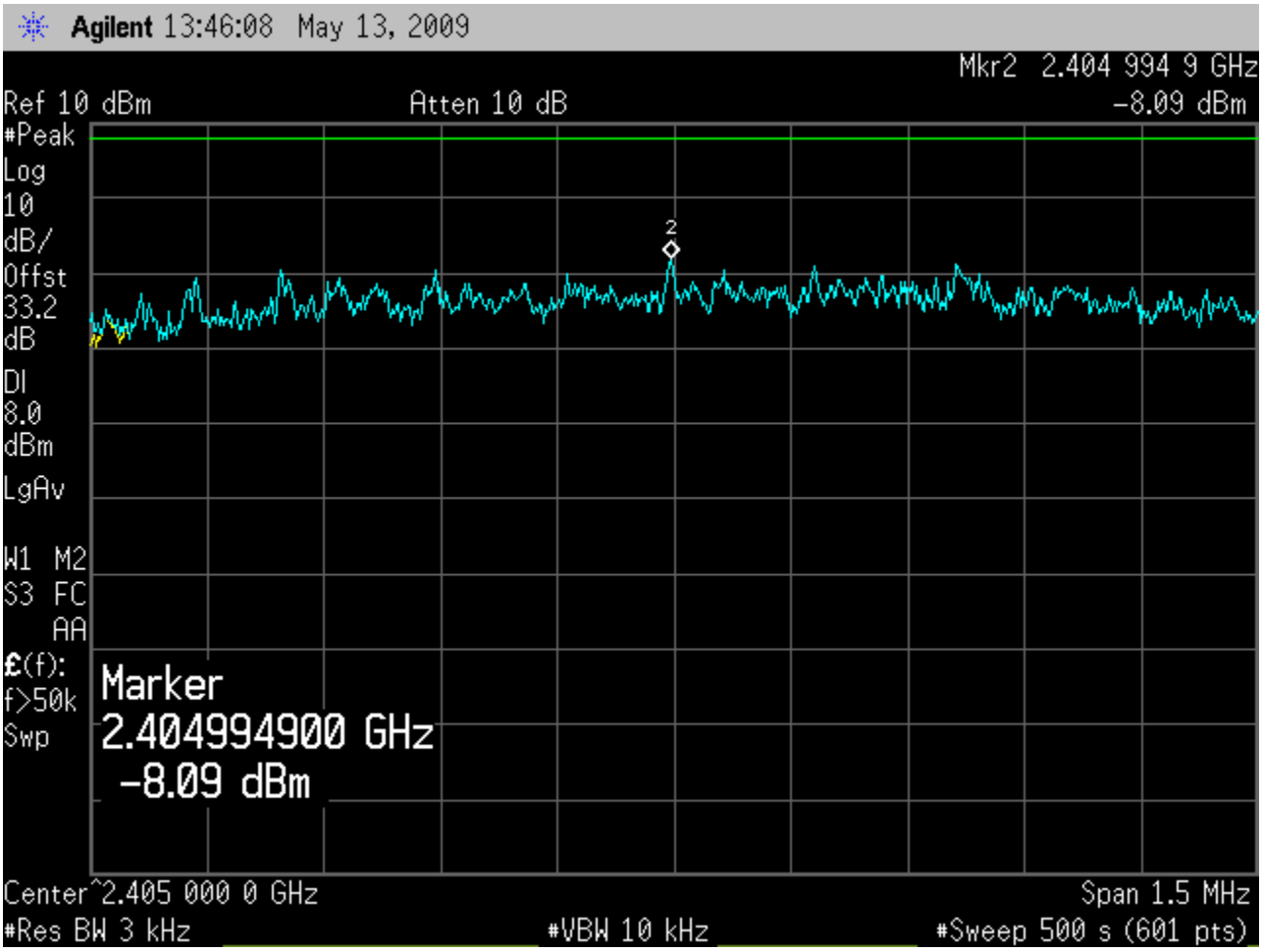
Convert RF Field strength reading from dBm to dBµV/m:
= -8.09dBm + 107
= 98.91 dBµV/m @ 3m

Convert maximum reading in dBµV/m to V/m:
E = $10^{((dB\mu V/m\ -120)/20)}$
= $10^{((98.91-120)/20)}$
= 0.0882 V/m

Convert dB gain to numeric gain:
G = $10^{(G/10)}$
= $10^{(1/10)}$
= 1.2589

Using the formula from Section 15.247(b) (3) – Power Output (Radiated Emission Test)
P = $(0.0882 \times 3)^2 / (30 \times 1.2589)$
= **0.001853 watts**

Converting watts to dBm:
P = 10 log (0.001853) + 30
= **2.67 dBm**



Appendix C: Block Diagram of Test Setups

Test Site For Radiated Emissions