

Advanced
Compliance Laboratory

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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT of

Hygiene Monitor (LF DIM)

MODEL: IT-373A
FCC ID: ST2-IT373A

December 04, 2012

This report concerns (check one): Original grant ☒ Class II change ☐	
Equipment type: <u>Low Power Intentional Radiator</u>	
Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes ☐ no ☒	
If yes, defer until: _____ (date)	
Company agrees to notify the Commission by _____ (date)	
of the intended date of announcement of the product so that the grant can be issued on that date.	
Transition Rules Request per 15.37? yes ☐ no ☒	
If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision.	
Report prepared for:	CENTRAK, INC.
Report prepared by:	Advanced Compliance Lab
Report number:	0048-121203-01-FCC



Lab Code: 200101

The test result in this report IS supported and covered by the NVLAP accreditation

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1. GENERAL INFORMATION

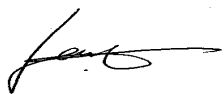
1.1 Verification of Compliance

EUT: Hygiene Monitor (LF DIM)
 Model: IT-373A
 Applicant: CENTRAK, INC.
 Test Type: FCC Part 15C CERTIFICATION
 Result: PASS
 Tested by: ADVANCED COMPLIANCE LABORATORY
 Test Date: December 04, 2012
 Report Number: 0048-121203-01-FCC

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	± 2.36	± 2.99	± 1.83



Wei Li
 Lab Manager
 Advanced Compliance Lab

Date December 04, 2012

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	LF DIM IT-373A (1)	ST2-IT373A	
Housing	PLASTICS		
Power Supply	6V DC Battery		
Operation Freq.	904MHz ~ 926MHz		
Receiver	IT-373A(RX)	Verification	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated February 21, 2012 (Test Firm Registration # 90601). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

Manufacture	Model	Serial No.	Description	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A0029 0	EMI Receiver	15/10/13
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/13
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/13
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	18/03/13
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	28/05/13
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	24/03/13
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/13

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING

FCC ID: ST2-IT373A

This device complies with part 15 of the FCC Rules. Operating is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 2.1 FCC ID Label
(Only FCC ID show on EUT)

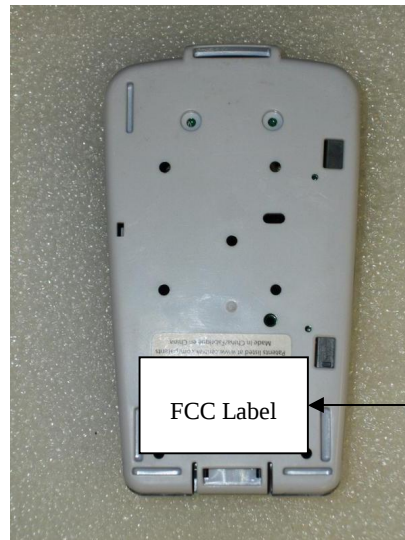


Figure 2.2 Location of the Label

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT with max length, 3”.

Testing was performed as EUT was continuously operated at the following frequency channels: Low=904MHz, Middle= 914MHz, High=926MHz.

Fresh external battery was used for extended operating time.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 to Figure 3.3 illustrate this system, which is tested standing along.





Figure 3.1 Radiated Test Setup

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. RADIATED EMISSION DATA

5.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dB μ V/m

RA: Amplitude of EMI Receiver before correction in dB μ V

AF: Antenna Factor in dB/m

CF: Cable Attenuation Factor in dB

AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

THE "DUTY CYCLE CORRECTION FACTOR" FOR SPURIOUS RADIATED EMISSIONS IS;
 $20 \log * (4 \text{ ms} / 100 \text{ ms}) = -28 \text{ dB}$, WHICH WAS USED TO CORRECT THE AVERAGE RADIATED EMISSION READINGS.

5.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 100KHz IF bandwidth / 100KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10th harmonics were investigated.

5.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 5.1.

Test Personnel:



Typed/Printed Name: Edward Lee

Date: December 04, 2012

Radiated Test Data (CH-904MHz/914MHz/926MHz)

Worst case: Vertical Orientation

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Peak Reading After Correction (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
904	V/Z	1.2	180	90.7	90.7	94	-3.3
1808	V/Z	1.1	235	58.1	30.1	54	-23.9
2712	V/Z	1.1	235	58.8	30.8	54	-23.2
904	H/Z	1.2	180	89.7	89.7	94	-4.3
1808	H/Z	1.0	180	56.4	28.4	54	-25.6
2712	H/Z	1.0	180	56.7	28.7	54	-25.3
914	V/Z	1.2	235	91.1	91.1	94	-2.9
1828	V/Z	1.1	270	60.5	32.5	54	-21.5
2712	V/Z	1.1	90	56.5	28.5	54	-25.5
914	H/Z	1.2	180	89.9	89.9	94	-4.1
1828	H/Z	1.1	180	57.8	29.8	54	-24.2
2742	H/Z	1.0	000	54.6	26.6	54	-27.4
926	V/Z	1.2	180	90.9	90.9	94	-3.1
1852	V/Z	1.0	270	63.8	35.8	54	-18.2
2778	V/Z	1.0	090	54.7	26.7	54	-27.3
926	H/Z	1.2	180	89.6	89.6	94	-4.4
1852	H/Z	1.0	180	59.4	31.4	54	-22.6
2778	H/Z	1.0	180	55.0	27.0	54	-27.0

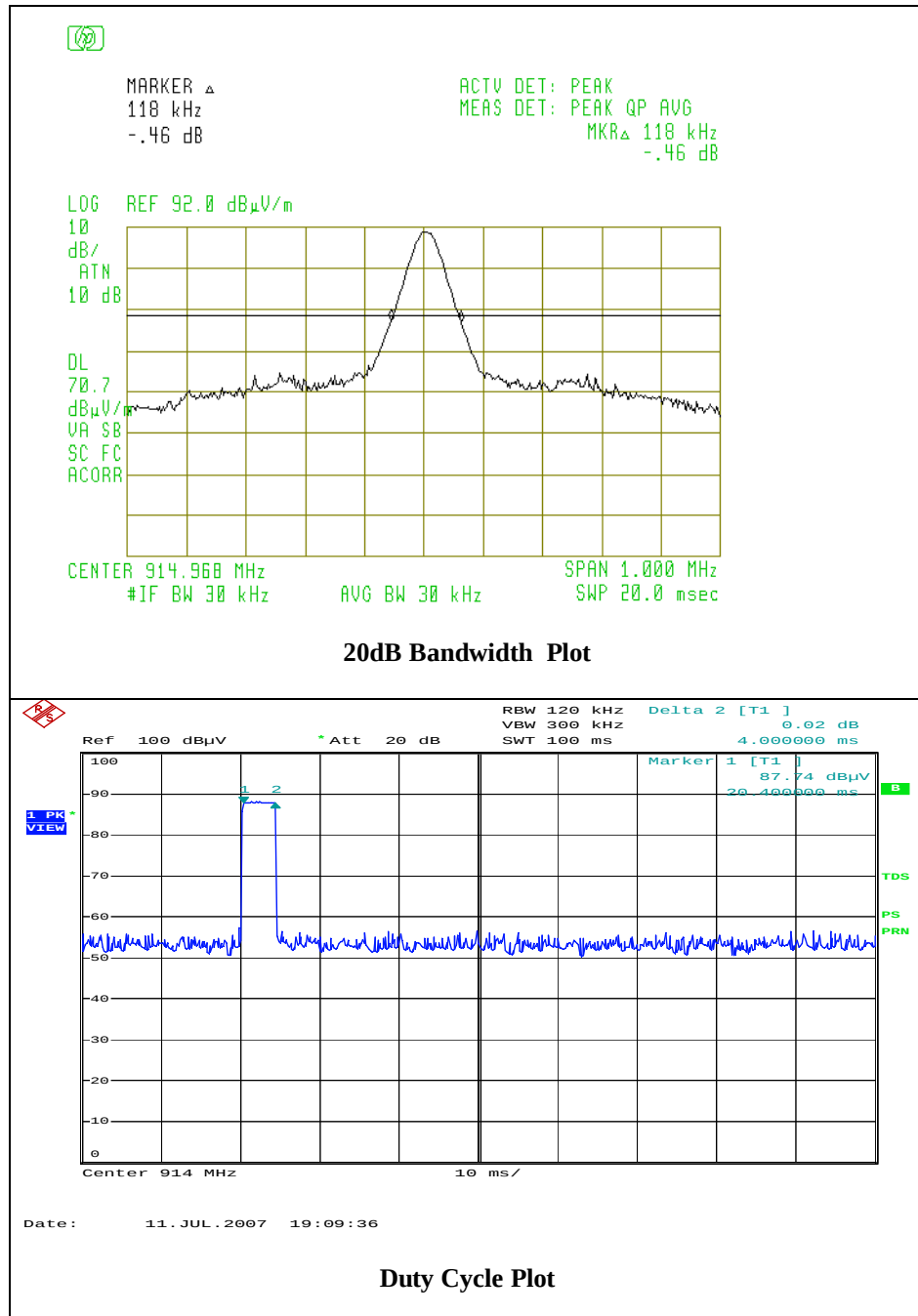
(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per Sec. 15.249. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.

(2) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

Other Spurious outside of the band 902-928MHz

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Peak Reading After Correction (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
754	V/Y	1.1	000	32.1		46.5	-14.4
806	V/Y	1.1	000	31.3		46.5	-15.2
878	V/Y	1.1	330	33.9		46.5	-12.6
964	V/Y	1.1	330	41.5		46.5	-5.0
754	H/Y	1.0	235	39.7		46.5	-6.8
806	H/X	1.0	235	33.6		46.5	-12.9
878	H/Y	1.0	125	34.5		46.5	-12.0
964	H/Y	1.0	125	40.1		46.5	-6.4

Comparing to the limit defined in Sec. 15.209, emissions below the limit by 20dB were not recorded.



5.4 125KHz Transmission Radiated Test Data

EUT is powered by battery and represents the worst case

A1.1 EUT at Vertical Orientation

Frequency (MHz)	Polarity (V,H) Position X	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC Limit@ 3m (1) (dBuV/m)	Difference (dBuV/m)
0.125	Loop	1.0	010	100.9		105.6	-4.7
0.245	Loop	1.0	020	56.5		99.6	-43.1
0.370	Loop	1.0	020	58.6		96.1	-37.5
0.495	Loop	1.0	010	44.7		73.7	-29.0
0.617	Loop	1.0	030	48.1		71.0	-22.9
0.748	Loop	1.0	270	41.9		70.1	-28.2

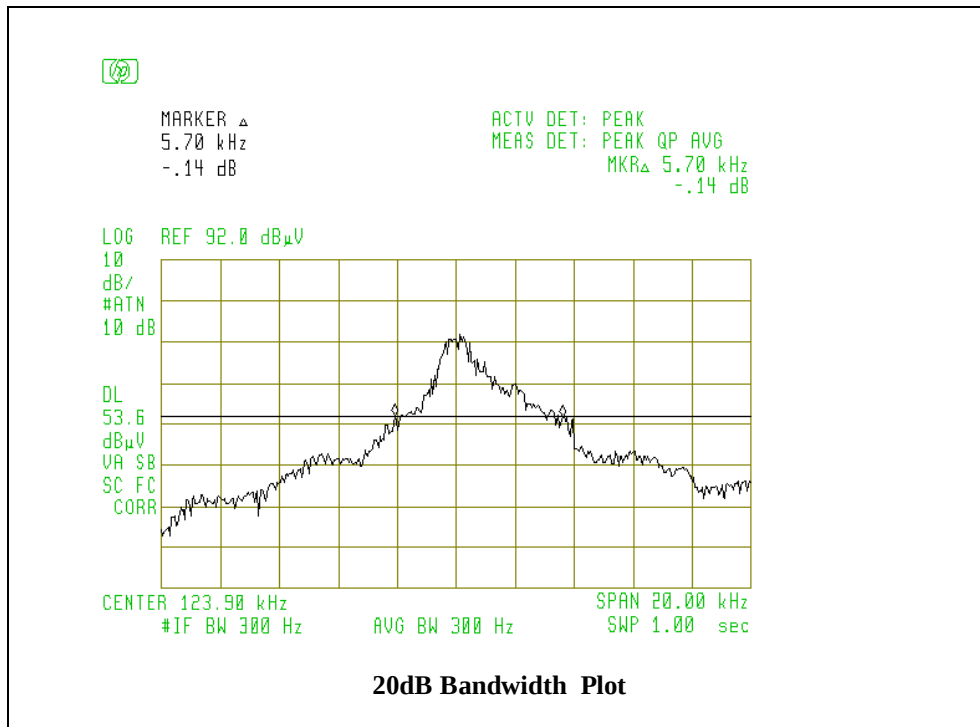
A1.2 EUT at Horizontal Orientation

Frequency (MHz)	Polarity (V,H) Position X	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC Limit@ 3m (1) (dBuV/m)	Difference (dBuV/m)
0.125	Loop	1.0	020	87.6		105.6	-18.0
0.259	Loop	1.0	020	83.8		99.6	-15.8
0.371	Loop	1.0	010	43.8		96.1	-52.3
0.498	Loop	1.0	030	38.6		73.7	-35.1
0.620	Loop	1.0	010	36.8		71.0	-34.2

(1) The limit for emissions per Sec. 15.249 with distance correction factor (40dB/decade at $f < 30$ MHz).

(2) If each peak reading is less than the FCC QP or average limit, it'll be not necessary to show the measured/ calculated QP or average reading (QP detector shall be used except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, in which an average detector shall be employed).

20 dB Bandwidth at 125KHz



6. EUT RECEIVING MODE VERIFICATION

Radiated Test Data for Receiving Mode (worst case: Vertical Orientation)

Frequency (MHz)	Polarity (H or V)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m(2) (dBuV/m)	FCC 3m Limit(1) (dBuV/m)	Difference (dBuV/m)
43.5	H	1.4	180	31.5	40.0	-8.5
158.5	H	1.2	180	33.6	43.5	-9.9
580	H	1.1	090	31.8	46.5	-14.7
610	H	1.0	090	31.6	46.5	-14.9
686	H	1.0	235	33.5	46.5	-13.0
43.5	V	1.4	235	34.8	40.0	-5.2
130	V	1.2	000	32.1	43.5	-11.4
486	V	1.1	330	29.1	46.5	-17.4
528	V	1.1	270	30.7	46.5	-15.8

(1) Receiving mode spurious emissions shall be lower than the limit defined in Sec. 15.209.

(2) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

7. PHOTOS OF TESTED EUT

The following photos show the inside details of the EUT.