

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

Virtual Wall
MODEL: IT-323H
FCC ID: ST2-IT323H

September 20, 2016

This report concerns (check one): Original grant <input checked="" type="checkbox"/> Class II change <input type="checkbox"/>	
Equipment type: <u>Low Power Intentional Radiator</u>	
Deferred grant requested per 47 CF 0.457(d)(1)(ii)?	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
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 <input type="checkbox"/> no <input checked="" type="checkbox"/>
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:	0048-160815-01-FCC-IC



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: Virtual Wall

Model: IT-323H

Applicant: CENTRAK, INC.

Test Type: FCC Part 15 Sub Part 15.249 & 15.209
IC RSS-210 (Issue 8) A2.9 & RSS-Gen (Issue 4)
CERTIFICATION *

Result: PASS

Tested by: ADVANCED COMPLIANCE LABORATORY

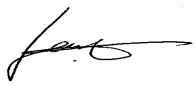
Test Date: August 31 ~ September 20, 2016

Report Number: 0048-160815-01-FCC-IC
* This application is for 900MHz band operation only.

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 September 20, 2016

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	Virtual Wall, Model IT-323H (1)	ST2-IT323H	
Housing	PLASTICS		
Power Supply	7.2V DC Battery		
Operation Freq.	904MHz ~ 926MHz		
Receiver	IT-323H(RX)	Verification	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2014 & C63.10-2013 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/y
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	25/09/16
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	17/06/17
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/17
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/17
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/17
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	8/28/17
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	18/03/17
COM-POWER	L1215A	191994	Line Impedance Stabilization Networks	24/03/18

All Test Equipment Used are Calibrated Traceable to NIST Standards. . Calibration Interval: two year.

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

Centrak	Monitor
Model No.:	IT-323H
FCC ID: ST2-IT323H	IC: 6012A-IT323H

This device complies with part 15 of the FCC & IC RSS-210 & RSS-Gen 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

Figure 2.1 ID Label

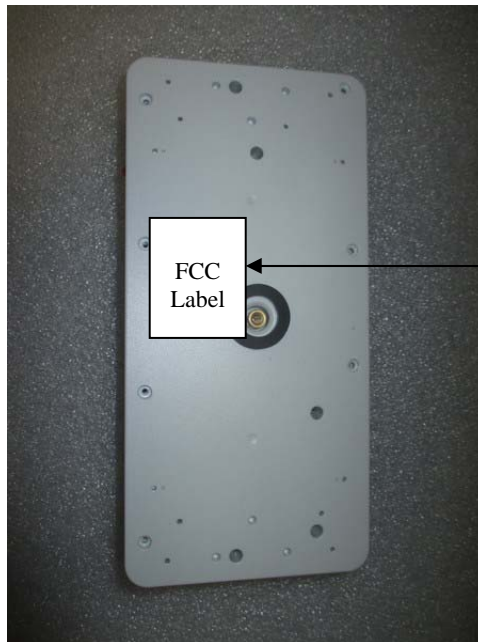


Figure 2.2 Location of the Label

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 custom made monopole wire antenna was permanently attached to the EUT with max length, 7” .

Testing was performed as EUT was continuously operated at the following frequency channels: Low=904MHz, Middle= 915MHz, High=926MHz.

Fresh external battery was used for extended operating time in battery mode.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

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



Figure 3.1 Radiated Test Setup





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. The frequency range from 9KHz 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: September 20, 2016

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

Operation Mode: Vertical Orientation

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak /QP Reading at 3m (2) (dBuV/m)	FCC/IC 3m Peak Limit (3) (dBuV/m)	Difference To Peak Limit (dBuV/m)	Average Reading with Correction (>1GHz) (dBuV/m)	FCC/IC 3m QP/Average Limit (1) (dBuV/m)	Difference To AVG Limit (dBuV/m)
904	V/Z	1.2	000	77.5				94	-16.5
1808	V/Z	1.1	000	40.1	74	-33.9	12.1	54	-41.9
2712	V/Z	1.1	000	42.2	74	-31.8	14.2	54	-39.8
904	H/Z	1.1	045	87.2				94	-6.8
1808	H/Z	1.0	045	45.7	74	-28.3	17.7	54	-36.3
2712	H/Z	1.0	045	44.1	74	-29.9	16.1	54	-37.9
915	V/Z	1.2	000	77.5				94	-16.5
1830	V/Z	1.1	000	39.6	74	-34.4	11.6	54	-42.4
2745	V/Z	1.1	000	42.3	74	-31.7	14.3	54	-39.7
915	H/Z	1.1	045	86.8				94	-7.2
1830	H/Z	1.0	045	44.6	74	-29.4	16.6	54	-37.4
2745	H/Z	1.0	045	44.1	74	-29.9	16.1	54	-37.9
926	V/Z	1.2	180	77.3				94	-16.7
1852	V/Z	1.1	090	40.1	74	-33.9	12.1	54	-41.9
2778	V/Z	1.1	180	42.6	74	-31.4	14.6	54	-39.4
926	H/Z	1.1	235	86.5				94	-7.5
1852	H/Z	1.0	045	43.3	74	-30.7	15.3	54	-38.7
2778	H/Z	1.0	045	43.8	74	-30.2	15.8	54	-38.2

(1) The limit for emissions within the 902-926MHz 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)
350	V	1.1	045	30.8		46.5	-15.7
635	V	1.1	045	34.6		46.5	-11.9
680	V	1.1	135	34.7		46.5	-11.8
765	V	1.0	135	35.4		46.5	-11.1
238	H	1.0	000	32.0		46.5	-14.5
348	H	1.0	330	32.6		46.5	-13.9
445	H	1.0	330	37.2		46.5	-9.3
680	H	1.1	000	37.9		46.5	-8.6
765	H	1.1	000	38.5		46.5	-8.0
825	H	1.1	000	36.4		46.5	-10.1

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

