

**Advanced  
Compliance Laboratory**

210 Cougar Court  
Hillsborough, NJ 08844  
Tel: (908) 927 9288  
Fax: (908) 927 0728

## **ELECTROMAGNETIC EMISSION COMPLIANCE REPORT**

of

### **Monitor**

MODEL: IT-313H

FCC ID: ST2-IT313H IC: 6012A-IT313H

***September 20, 2016***

This report concerns (check one): Original grant ☒ Class II change ☐  
Equipment type: Low Power Intentional Radiator

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  
provision.

Report prepared for: CENTRAK, INC.  
Report prepared by: Advanced Compliance Lab  
Report number: 0048-160815-02-FCC-IC



**Lab Code: 200101**

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

## Table of Contents

|                                                |           |
|------------------------------------------------|-----------|
| Report Cover Page.....                         | 1         |
| Table of Contents .....                        | 2         |
| Figures.....                                   | 3         |
| <b>1. GENERAL INFORMATION .....</b>            | <b>4</b>  |
| 1.1 Verification of Compliance .....           | 4         |
| 1.2 Equipment Modifications.....               | 5         |
| 1.4 Test Methodology.....                      | 6         |
| 1.5 Test Facility .....                        | 6         |
| 1.6 Test Equipment .....                       | 6         |
| 1.7 Statement for the Document Use .....       | 7         |
| <b>2. PRODUCT LABELING.....</b>                | <b>8</b>  |
| <b>3. SYSTEM TEST CONFIGURATION .....</b>      | <b>9</b>  |
| 3.1 Justification .....                        | 9         |
| 3.2 Special Accessories.....                   | 9         |
| 3.3 Configuration of Tested System .....       | 9         |
| <b>4. SYSTEM SCHEMATICS .....</b>              | <b>12</b> |
| <b>5. RADIATED EMISSION DATA .....</b>         | <b>13</b> |
| 5.1 Field Strength Calculation .....           | 13        |
| 5.2 Test Methods and Conditions .....          | 13        |
| 5.3 Test Data .....                            | 13        |
| <b>6. EUT RECEIVING MODE VERIFICATION.....</b> | <b>18</b> |
| <b>7. PHOTOS OF TESTED EUT .....</b>           | <b>19</b> |

## Figures

|                                                              |              |
|--------------------------------------------------------------|--------------|
| <b>Figure 2.1 ID Label.....</b>                              | <b>8</b>     |
| <b>Figure 2.2 Location of Label on Back of the EUT .....</b> | <b>8</b>     |
| <b>Figure 3.1 Radiated Test Setups 1.....</b>                | <b>10</b>    |
| <b>Figure 4.1 EUT Schematics.....</b>                        | <b>12</b>    |
| <b>Figure 7.1-7.6 EUT Details.....</b>                       | <b>20-24</b> |

## 1. GENERAL INFORMATION

### 1.1 Verification of Compliance

EUT: Monitor

Model: IT-313H

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

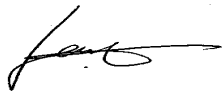
Test Date: August 31~ September 20, 2016

Report Number: 0048-160815-02-FCC-IC

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC/IC 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.       | $\pm 2.36$      | $\pm 2.99$      | $\pm 1.83$      |



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            | ID                                     | CABLE |
|-----------------|------------------------|----------------------------------------|-------|
| Product         | Monitor<br>IT-313H (1) | FCC ID: ST2-IT313H IC:<br>6012A-IT313H |       |
| Housing         | PLASTICS               |                                        |       |
| Power Supply    | 7.2V DC Battery        |                                        |       |
| Operation Freq. | 904MHz ~ 926MHz        |                                        |       |
| Receiver        | IT-313H(RX)            | Verification                           |       |

(1) EUT submitted for grant.

### 1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2014& ANSI 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, which is designated by IC as “ site IC 3130A”. This site is also accepted by FCC to perform measurements under Part 15 or 18 (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<br>dd/mm/y<br>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

|                                            |                |
|--------------------------------------------|----------------|
| <b>Centrak</b>                             | <b>Monitor</b> |
| <b>Model No.:</b>                          | <b>IT-313H</b> |
| <b>FCC ID: ST2-IT313H IC: 6012A-IT313H</b> |                |

**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 operation.**

**Figure 2.1 ID Label (Statement may be shown in its manual)**



**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, 3.5" (about 1/4 wavelength).

Testing was performed as EUT was continuously operated at the following frequency channels: Low=904 MHz, Middle= 915 MHz, High=926 MHz for 900 MHz Band and 125 KHz for LF band.

Fresh external battery was used for extended operating time.

#### **3.2 Special Accessories**

N/A

#### **3.3 Configuration of Tested System**

Figures 3.1 illustrate this system, which is tested standing alone for Radiated Emissions.





**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 $\mu$ V/m

RA: Amplitude of EMI Receiver before correction in dB $\mu$ 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/915MHz/926MHz)**

Operation Mode: Vertical Orientation

| Frequency<br>(MHz) | Polarity<br>(V,H)<br>Position<br>(X,Y,Z) | Antenna<br>Height<br>(m) | Azimuth<br>(Degree) | Peak /QP<br>Reading<br>at 3m<br>(2)<br>(dBuV/m) | FCC/IC 3m<br>Peak Limit<br>(3)<br>(dBuV/m) | Difference<br>To Peak<br>Limit<br>(dBuV/m) | Average<br>Reading<br>with<br>Correction<br>(>1GHz)<br>(dBuV/m) | FCC/IC 3m<br>QP/Average<br>Limit<br>(1)<br>(dBuV/m) | Difference<br>To AVG<br>Limit<br>(dBuV/m) |
|--------------------|------------------------------------------|--------------------------|---------------------|-------------------------------------------------|--------------------------------------------|--------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------|
| 904                | V/Z                                      | 1.1                      | 180                 | 86.9                                            |                                            |                                            |                                                                 | 94                                                  | -7.1                                      |
| 1808               | V/Z                                      | 1.1                      | 180                 | 47.2                                            | 74                                         | -26.8                                      | 19.2                                                            | 54                                                  | -34.8                                     |
| 2712               | V/Z                                      | 1.1                      | 035                 | 51.1                                            | 74                                         | -22.9                                      | 23.1                                                            | 54                                                  | -30.9                                     |
| 904                | H/Z                                      | 1.0                      | 110                 | 92.2                                            |                                            |                                            |                                                                 | 94                                                  | -1.8                                      |
| 1808               | H/Z                                      | 1.0                      | 135                 | 51.7                                            | 74                                         | -22.3                                      | 23.7                                                            | 54                                                  | -30.3                                     |
| 2712               | H/Z                                      | 1.0                      | 135                 | 51.8                                            | 74                                         | -22.2                                      | 23.8                                                            | 54                                                  | -30.2                                     |
|                    |                                          |                          |                     |                                                 |                                            |                                            |                                                                 |                                                     |                                           |
| 915                | V/Z                                      | 1.1                      | 180                 | 85.3                                            |                                            |                                            |                                                                 | 94                                                  | -8.7                                      |
| 1830               | V/Z                                      | 1.1                      | 180                 | 43.5                                            | 74                                         | -30.5                                      | 15.5                                                            | 54                                                  | -38.5                                     |
| 2745               | V/Z                                      | 1.1                      | 045                 | 47.3                                            | 74                                         | -26.7                                      | 19.3                                                            | 54                                                  | -34.7                                     |
| 915                | H/Z                                      | 1.0                      | 130                 | 91.3                                            |                                            |                                            |                                                                 | 94                                                  | -2.7                                      |
| 1830               | H/Z                                      | 1.0                      | 135                 | 51.0                                            | 74                                         | -23.0                                      | 23.0                                                            | 54                                                  | -31.0                                     |
| 2745               | H/Z                                      | 1.0                      | 135                 | 52.0                                            | 74                                         | -22.0                                      | 24.0                                                            | 54                                                  | -30.0                                     |
|                    |                                          |                          |                     |                                                 |                                            |                                            |                                                                 |                                                     |                                           |
| 926                | V/Z                                      | 1.1                      | 180                 | 84.1                                            |                                            |                                            |                                                                 | 94                                                  | -9.9                                      |
| 1852               | V/Z                                      | 1.1                      | 000                 | 41.4                                            | 74                                         | -32.6                                      | 13.4                                                            | 54                                                  | -40.6                                     |
| 2778               | V/Z                                      | 1.1                      | 090                 | 44.9                                            | 74                                         | -29.1                                      | 16.9                                                            | 54                                                  | -37.1                                     |
| 926                | H/Z                                      | 1.0                      | 045                 | 90.5                                            |                                            |                                            |                                                                 | 94                                                  | -3.5                                      |
| 1852               | H/Z                                      | 1.0                      | 135                 | 50.0                                            | 74                                         | -24.0                                      | 22.0                                                            | 54                                                  | -32.0                                     |
| 2778               | H/Z                                      | 1.0                      | 135                 | 50.9                                            | 74                                         | -23.1                                      | 22.9                                                            | 54                                                  | -31.1                                     |

(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per FCC Sec. 15.249 & IC RSS-210 Annex 2.9. 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 the peak reading is less than the FCC/IC quasi-peak or average limit, it'll be not necessary to show the measured/ calculated quasi-peak or average reading.

(3) For above 1GHz range, peak reading shall meet the limit: average Limit+20dB.

**Other Spurious outside of the band 902-928MHz**

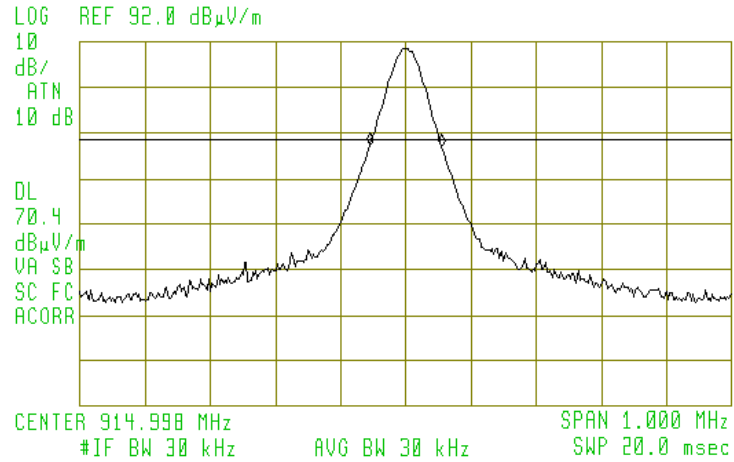
| <b>Frequency<br/>(MHz)</b> | <b>Polarity<br/>(V,H)<br/>Position<br/>(X,Y,Z)</b> | <b>Antenna<br/>Height<br/>(m)</b> | <b>Azimuth<br/>(Degree)</b> | <b>Peak<br/>Reading<br/>at 3m<br/>(2)<br/>(dBuV/m)</b> | <b>Peak<br/>Reading<br/>After<br/>Correction<br/>(dBuV/m)</b> | <b>FCC/IC<br/>3m<br/>Limit<br/>(1)<br/>(dBuV/m)</b> | <b>Difference<br/>(dBuV/m)</b> |
|----------------------------|----------------------------------------------------|-----------------------------------|-----------------------------|--------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------|--------------------------------|
| 350                        | V/Z                                                | 1.1                               | 180                         | 35.8                                                   |                                                               | 46.5                                                | -10.7                          |
| 425                        | V/Z                                                | 1.1                               | 180                         | 35.9                                                   |                                                               | 46.5                                                | -10.6                          |
| 845                        | V/Z                                                | 1.1                               | 135                         | 40.9                                                   |                                                               | 46.5                                                | -5.6                           |
| 350                        | H/Z                                                | 1.0                               | 090                         | 36.2                                                   |                                                               | 46.5                                                | -10.3                          |
| 410                        | H/Z                                                | 1.0                               | 270                         | 35.8                                                   |                                                               | 46.5                                                | -10.7                          |
| 725                        | H/Z                                                | 1.0                               | 270                         | 41.3                                                   |                                                               | 46.5                                                | -5.2                           |
| 865                        | H/Z                                                | 1.0                               | 000                         | 39.8                                                   |                                                               | 46.5                                                | -6.7                           |

Comparing to the limit defined in Sec. 15.209 & RSS-210, emissions below the limit by 20dB were not recorded.



MARKER  $\Delta$   
110 kHz  
-.42 dB

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR  $\Delta$  110 kHz  
-.42 dB

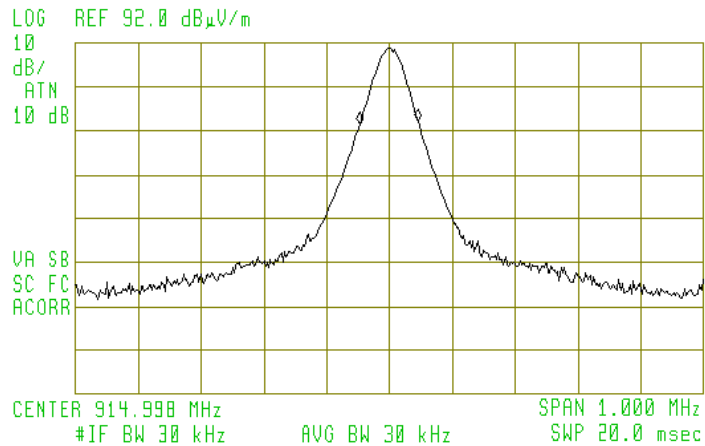


**20dB Bandwidth Plot**



MARKER  $\Delta$   
93 kHz  
.69 dB

ACTV DET: PEAK  
MEAS DET: PEAK QP AVG  
MKR  $\Delta$  93 kHz  
.69 dB



**99% Bandwidth Plot**

