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# 1. GENERAL INFORMATION

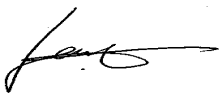
## 1.1 Verification of Compliance

EUT: Temperature Sensor 2.0  
Model: ITD-738F  
Applicant: CENTRAK, INC.  
Test Type: FCC Part 15.249 &  
IC RSS-210 (Issue 8) A2.9 & RSS-Gen (Issue 3)  
Result: PASS  
Tested by: ADVANCED COMPLIANCE LABORATORY  
Test Date: July 21, 2014  
Report Number: 0048-140502-01

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.	$\pm 2.36$	$\pm 2.99$	$\pm 1.83$

  
\_\_\_\_\_  
Wei Li  
Lab Manager  
Advanced Compliance Lab

Date July 21, 2014

## 1.2 Equipment Modifications

N/A

### 1.3 Product Information

#### System Configuration

ITEM	DESCRIPTION	FCC/IC ID	CABLE
Product	Temperature Sensor 2.0 ITD-738F (1)	ST2-ITD738F 6012A-ITD738F	
Housing	PLASTICS		
Power Supply	3.6V DC Battery		
Operation Freq.	904MHz ~ 926MHz , 2412MHz~2462MHz		
Receiver	ITD-738F(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, USA. This site is accepted by FCC to perform measurements under Part 15 or 18 (Registration # 90601) and also designated by IC as “site IC 3130”. This site 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	3448A00290	EMI Receiver	15/10/14
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/15
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/15
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	28/05/14
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	18/03/15
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	24/03/15
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/15
ARA	MWH-1826/B	1013	18-26GHZ Horn Antena	18/02/15

All Test Equipment Used are Calibrated Traceable to NIST Standards. Calibration Interval: 2 years.

### **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. & Canada Government.

## 2. PRODUCT LABELING

**Centrak      Temperature Sensor 2.0**  
**Model No.: ITD-738F**  
**FCC ID: ST2-ITD738F    IC: 6012A-ITD738F**

This device complies with part 15 of the FCC Rules and 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 FCC/IC ID Label  
(Only ID show on the EUT)

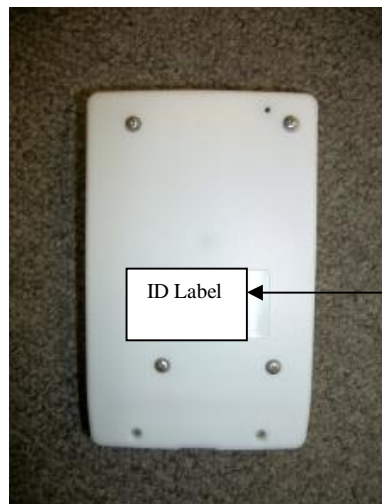


Figure 2.2 Location of the Label



### **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 900MHz Band antenna is permanently attached to the EUT with max length, 3"; its 2.4GHz band antenna is a surface mounted antenna ( working with FCC certified 2.4GHz RF Module. Antenna Spec.: made by Johanson Technology, Inc., P/N 2450AT42A100, 2.4GHz Band, 0 dBi, XZ-Vertical Polarization).

Testing was performed as EUT was continuously operated at the following frequency channels:

Low=904MHz, Middle= 915MHz, High=926MHz and  
Low=2412MHz, Middle= 2437MHz, High=2462MHz

900MHz band transmitter and 2.4GHz band transmitter can not be operated simultaneously.

Fresh external battery was used for extended operating time.

#### **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**

## **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. Up to 10<sup>th</sup> 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: July 21, 2014

**Radiated Test Data (CH-904MHz/915MHz/926MHz)**

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	1.1	030	93.0				94	-1.0
1808	V/Z	1.1	000	59.9	74	-14.1	31.9	54	-22.1
2712	V/Z	1.1	000	70.5	74	-3.5	42.5	54	-11.5
904	H/Z	1.0	000	87.9				94	-6.1
1808	H/Z	1.0	000	64.5	74	-9.5	36.5	54	-17.5
2712	H/Z	1.0	165	65.6	74	-8.4	37.6	54	-16.4
915	V/Z	1.1	030	93.1				94	-0.9
1830	V/Z	1.1	000	64.6	74	-9.4	36.6	54	-17.4
2745	V/Z	1.1	000	64.8	74	-9.2	36.8	54	-17.2
915	H/Z	1.0	000	88.5				94	-5.5
1828	H/Z	1.0	000	60.6	74	-13.4	32.6	54	-21.4
2745	H/Z	1.0	165	68.6	74	-5.4	40.6	54	-13.4
926	V/Z	1.1	030	92.9				94	-1.1
1852	V/Z	1.1	000	65.2	74	-8.8	37.2	54	-16.8
2778	V/Z	1.1	000	64.4	74	-9.6	36.4	54	-17.6
926	H/Z	1.0	000	88.0				94	-6
1852	H/Z	1.0	000	60.8	74	-13.2	32.8	54	-21.2
2778	H/Z	1.0	165	67.0	74	-7	39	54	-15

**Radiated Test Data (CH-2412MHz/2437MHz/2462MHz & Harmonics)**

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)
2412	H/Z	1.1	180	84.8	94	-9.2	(2)	94	-9.2
4824	H/Z	1.1	180	49.7	74	-24.3		54	-4.3
2412	V/Z	1.1	090	90.7	94	-3.7		94	-3.7
4824	V/Z	1.1	090	51.0	74	-23.0		54	-3.0
2437	H/Z	1.0	000	88.1	94	-5.9		94	-5.9
4874	H/Z	1.0	000	50.9	74	-23.1		54	-3.1
2437	V/Z	1.0	300	90.0	94	-4.0		94	-4.0
4874	V/Z	1.0	300	51.8	74	-22.2		54	-2.2
2462	H/Z	1.0	300	89.0	94	-5.0		94	-5.0
4924	H/Z	1.0	300	50.5	74	-23.5		54	-3.5
2462	V/Z	1.0	180	91.7	94	-2.3		94	-2.3
4924	V/Z	1.0	180	51.5	74	-22.5		54	-2.5

(1) The limit for emissions within the 902-928MHz band & 2400-2483.5MHz aband 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**

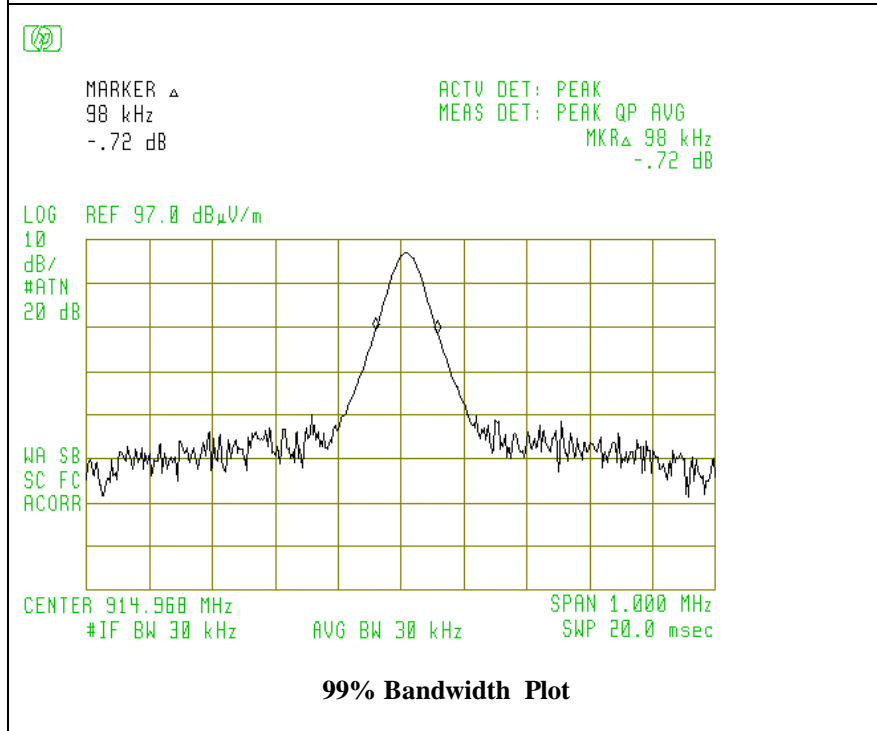
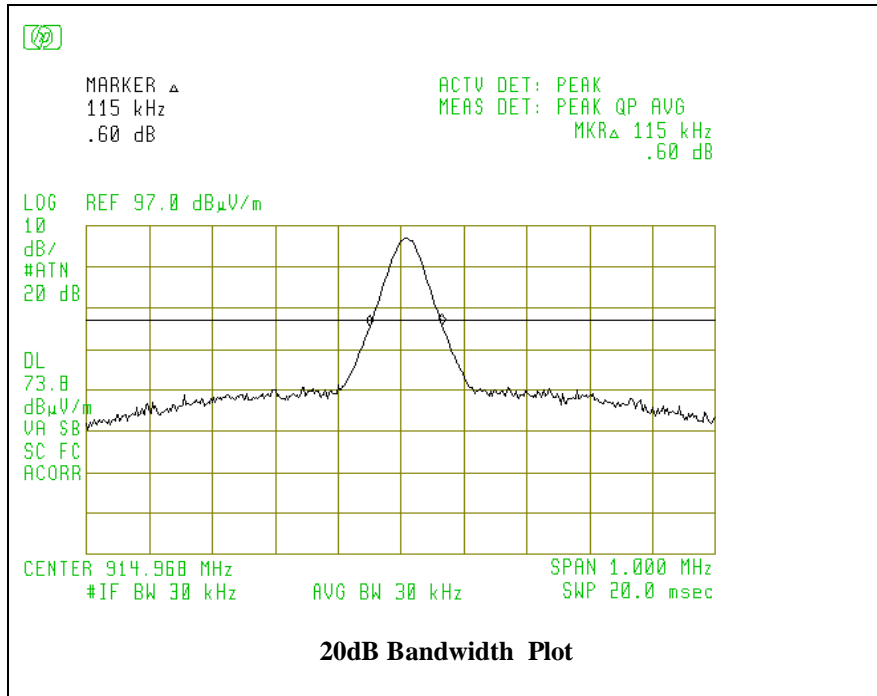
Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
546	H/Z	1.0	000	35.5	46.5	-11.0
712	H/Z	1.0	180	39.6	46.5	-6.9
874	H/Z	1.0	180	41.2	46.5	-5.3
946	H/Z	1.0	235	41.9	46.5	-4.6
962	H/Z	1.0	235	41.5	46.5	-5.0
562	V/Z	1.1	090	36.3	46.5	-10.2
814	V/Z	1.1	315	39.5	46.5	-7.0
886	V/Z	1.1	315	41.2	46.5	-5.3
944	V/Z	1.1	045	41.4	46.5	-5.1
954	V/Z	1.1	090	41.8	46.5	-4.7

**Other Spurious outside of the band 2400-2483.5MHz**

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
1450.0	V	1.1	045	51.2	54.0	-2.8
1692.0	V	1.1	045	51.5	54.0	-2.5
1905.5	V	1.1	045	49.7	54.0	-4.3
1450.0	H	1.0	180	47.8	54.0	-6.2
1692.0	H	1.0	235	48.3	54.0	-5.7
1905.5	H	1.0	235	47.0	54.0	-7.0

Comparing to the limit defined in FCC Sec. 15.209/IC RSS-Gen, emissions below the limit by 20dB were not recorded.

900MHz Bandwidth



2400MHz Bandwidth

