Advanced
Compliance Laboratory

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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

LOW FREQUENCY MONITOR
(for 900MHz Band & 125KHz Transmissions)
MODEL: ITD-34Y
FCC ID: ST2-DM34Y

September 17, 2012

This report concerns (check one): Original grant __x__ Class II change _____ Equipment type: Low Power Intentional Radiator
Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__ 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 __x__ 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: 0048-120904-03

NVLAP®

Lab Code: 200101 **The test result in this report IS supported and covered by the NVLAP accreditation**

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1. GENERAL INFORMATION

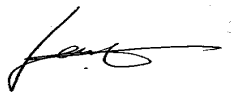
1.1 Verification of Compliance

EUT:	LOW FREQUENCY MONITOR
Model:	ITD-34Y
Applicant:	CENTRAK, INC.
Test Type:	FCC Part 15C Sec. 15.209, 15.249 CERTIFICATION
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	September 17, 2012
Report Number:	0048-120904-03

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 17, 2012

1.2 Equipment Modifications

N/A

1.3 Product Information

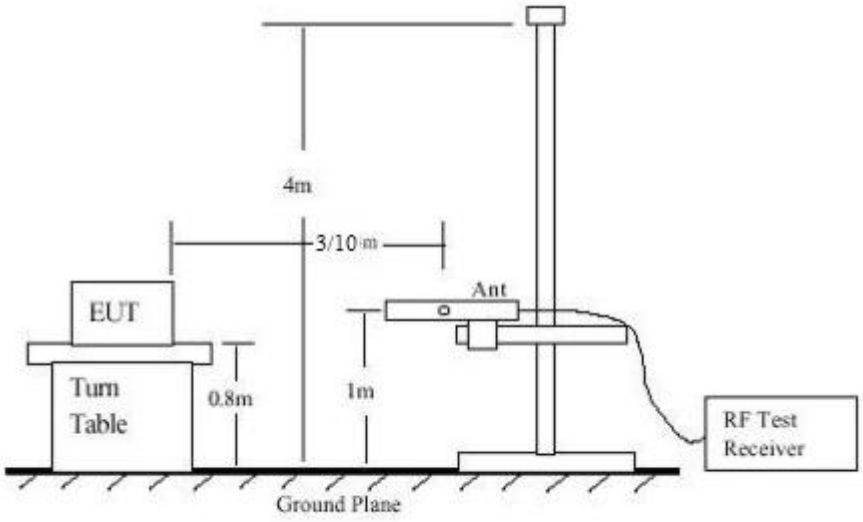
System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	LOW FREQUENCY MONITOR (1)	ST2-DM34Y	
Housing	PLASTICS		
Power Supply	3V DC Battery		
Operation Freq.	904MHz ~ 926MHz , 125KHz		
Receiver	2X34Y(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 31/0 meters.



Radiated Emission Measurement

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 May 19, 1997 (Refer to: 31040/PRV 1300F2). 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	15/10/12
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	25/8/13
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/13
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/13
ARA	MWH-1826/B	1013	18-26GHZ Horn Antena	10/2/2013
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/13
Electro-Meterics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	28/05/13
Fischer Custom	LISN-1	900-4-0008	Line Impedance Stabilization Networks	18/03/13
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	24/03/13

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-DM34Y

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 shown on EUT)

Figure 2.2 FCC Label Location

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it): It is attached to walls with vertical orientation. And its antenna was permanently attached to the EUT: wire type (max length 3") for 900MHz band & KGEA-BFCR LF Emitter antenna for 125KHz.

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

Low=904MHz, Middle= 915MHz, High=926MHz and
Low Frequency channel=125KHz

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 (a)

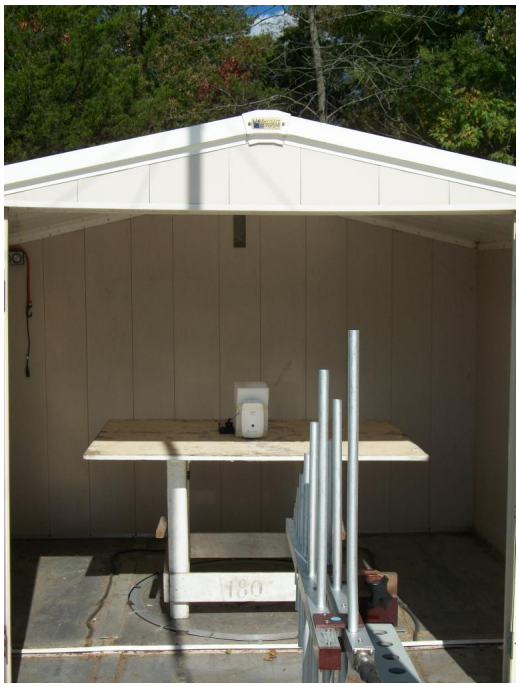


Figure 3.1 Radiated Test Setup (b)

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 dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
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 ms / 100 ms) = -28 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 radio spectrum was investigated from the lowest frequency generated within the device (without going below 9 kHz) up to the 10^{th} harmonic of the rated transmitted emission.

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 17, 2012

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

Frequency (MHz)	Antenna Polarity (V,H) Position Z	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
904	V	1.1	000	88.7	60.7	94	-33.3
1808	V	1.1	000	57.2	29.2	54	-24.8
2712	V	1.0	180	58.3	30.3	54	-23.7
904	H	1.1	315	88.0	60.0	94	-34.0
1808	H	1.1	090	53.7	25.7	54	-28.3
2712	H	1.0	000	56.2	28.2	54	-25.8
915	V	1.1	000	88.3	60.3	94	-33.7
1830	V	1.1	090	55.7	27.7	54	-26.3
2745	V	1.0	045	56.1	28.1	54	-25.9
915	V	1.1	315	86.3	58.3	94	-35.7
1830	H	1.1	000	52.1	24.1	54	-29.9
2745	H	1.0	330	56.7	28.7	54	-25.3
926	V	1.1	000	89.1	61.1	94	-32.9
1852	V	1.1	090	55.1	27.1	54	-26.9
2778	V	1.0	270	55.5	27.5	54	-26.5
926	H	1.1	270	86.1	58.1	94	-35.9
1852	H	1.1	090	53.4	25.4	54	-28.6
2778	H	1.0	330	55.0	27.0	54	-27.0

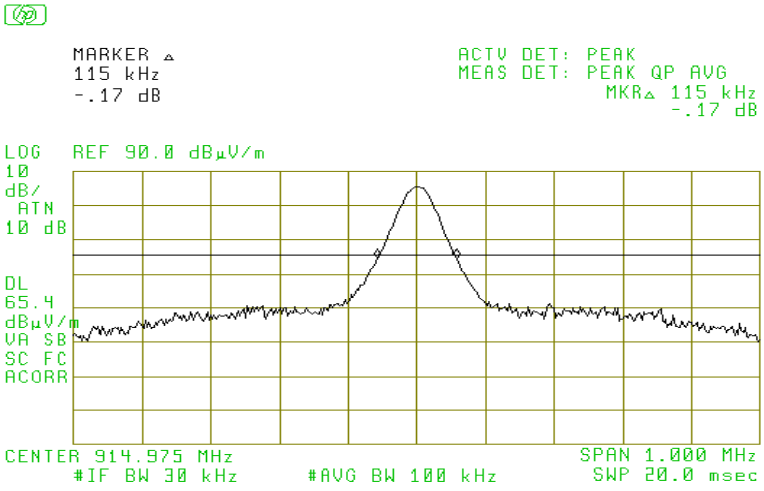
(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per Sec. 15.249. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.
(2) If each peak reading is less than 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 Z	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	FCC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
462.5	V	1.1	200	35.6	46.5	-10.9
575.0	V	1.1	260	34.5	46.5	-12
890.3	V	1.1	170	36.7	46.5	-9.8
928.4	V	1.0	180	36.5	46.5	-10
368.8	H	1.0	100	32.3	46.5	-14.2
469.4	H	1.0	020	36.1	46.5	-10.4

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

20 dB Bandwidth : 900MHz Band



20dB Bandwidth Plot

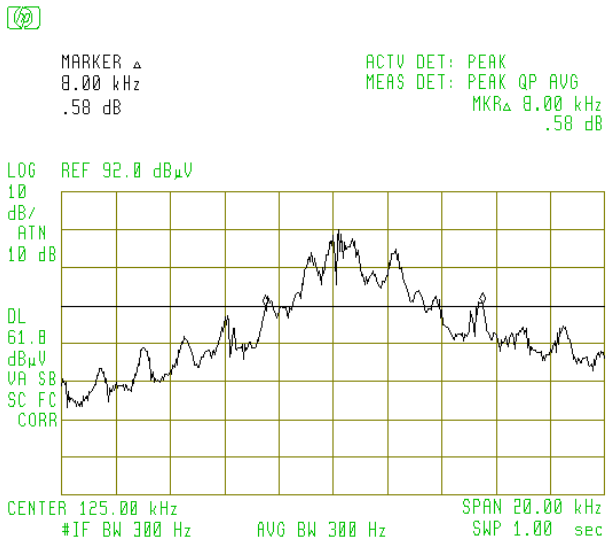
Radiated Test Data

(low frequency channel= 125KHz & harmonics/spurious. Worst case recorded)

Frequency (MHz)	Polarity (V,H) Position Z	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	030	95.3		105.6	-10.3
0.251	Loop	1.0	010	83.8		99.6	-15.8
0.495	Loop	1.0	020	67.5		73.7	-6.2
0.748	Loop	1.0	340	64.3		70.1	-5.8

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



20dB Bandwidth Plot