Advanced
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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Of

Georgia Pacific DIM
MODEL: IT-373GPX
FCC ID: ST2-IT373GPX

December 02, 2014

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: 0048-141125-01

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

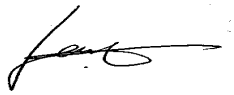
1.1 Verification of Compliance

EUT:	Georgia Pacific DIM
Model:	IT-373GPX
Applicant:	CENTRAK, INC.
Test Type:	FCC Part 15 Sub Part 15.249 & 15.209
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	December 01, 2014
Report Number:	0048-141125-01

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.	±2.36	±2.99	±1.83



Wei Li
Lab Manager
Advanced Compliance Lab

Date December 01, 2014

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	ID	CABLE
Product	IT-373GPX Georgia Pacific DIM (1)	FCC ID: ST2-IT373GPX	
Housing	PLASTICS		
Power Supply	1.5Vx4 AA DC Battery		
Operation Freq.	904MHz ~ 926MHz		
Receiver	IT-373GPX(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 Somerset, New Jersey, which is designated by IC as " site IC 3130". 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 dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	15/10/15
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/15
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/15
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	28/05/15
Electro-Metrics	ALR-25M/30	289	10KHz-30MHz Active Loop Antenna	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

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

Georgia Pacific DIM Model No.: IT-373GPX

FCC ID: ST2-IT373GPX

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.

Figuare 2.1 ID Label

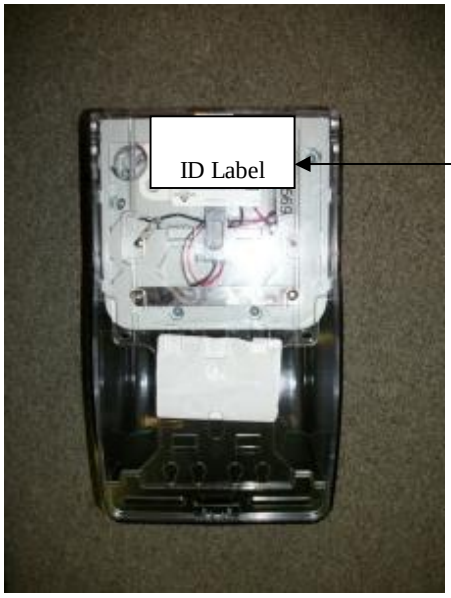


Figure 2.2 Location of the Label

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 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= 915MHz, High=926MHz for 900MHz Band and 125KHz for LF band.

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 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 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: December 01, 2014

Radiated Test Data (CH-904MHz/915MHz/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	1.1	270	83.6				94	-10.4
1808	V/Z	1.1	270	57.5	74	-16.5	29.5	54	-24.5
2712	V/Z	1.1	180	67.5	74	-6.5	39.5	54	-14.5
904	H/Z	1.0	045	81.4				94	-12.6
1808	H/Z	1.0	180	56.5	74	-17.5	28.5	54	-25.5
2712	H/Z	1.0	045	64.4	74	-9.6	36.4	54	-17.6
915	V/Z	1.1	270	84.4				94	-9.6
1830	V/Z	1.1	090	57.6	74	-16.4	29.6	54	-24.4
2745	V/Z	1.1	090	67.1	74	-6.9	39.1	54	-14.9
915	H/Z	1.0	000	82.9				94	-11.1
1830	H/Z	1.0	045	56.1	74	-17.9	28.1	54	-25.9
2745	H/Z	1.0	045	65.4	74	-8.6	37.4	54	-16.6
926	V/Z	1.1	270	85.2				94	-8.8
1852	V/Z	1.1	090	58.3	74	-15.7	30.3	54	-23.7
2778	V/Z	1.1	090	67.1	74	-6.9	39.1	54	-14.9
926	H/Z	1.0	000	83.9				94	-10.1
1852	H/Z	1.0	090	55.4	74	-18.6	27.4	54	-26.6
2778	H/Z	1.0	045	67.0	74	-7.0	39	54	-15.0

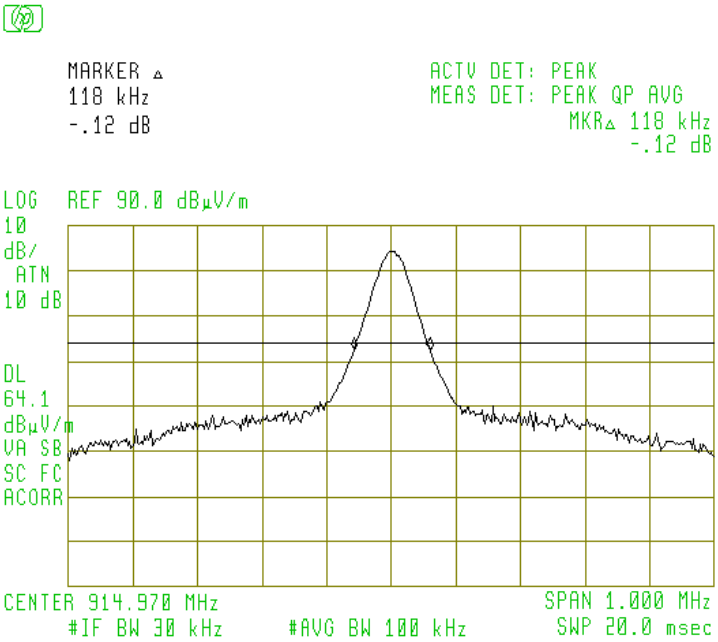
(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per FCC Sec. 15.249 & IC RSS-210 Annex 2.9. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.
(2) If the 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

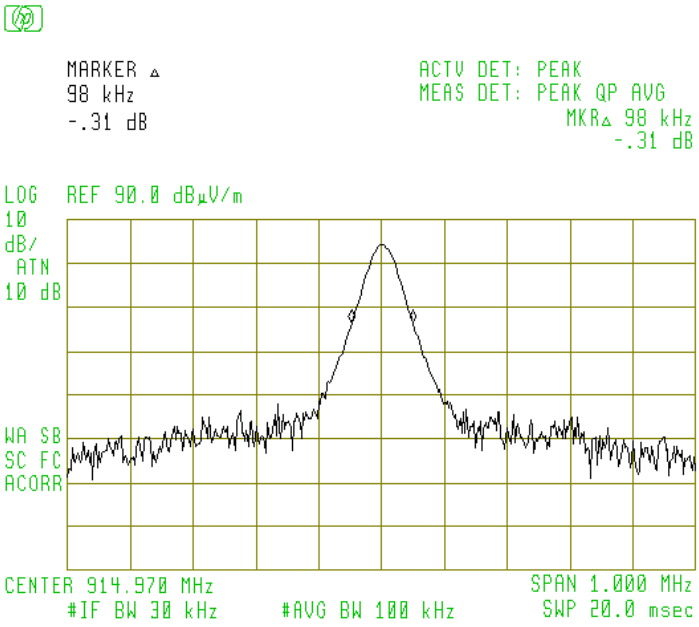
Other Spurious outside of the band 902-928MHz

Frequency (MHz)	Polarity (V,H) Position (X,Y,Z)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m (2) (dBuV/m)	Reading After Correction (dBuV/m)	FCC/IC 3m Limit (1) (dBuV/m)	Difference (dBuV/m)
750	H/Z	1.0	235	39.2		46.5	-7.3
786	H/Z	1.0	235	37.5		46.5	-9.0
845	H/Z	1.0	045	38.9		46.5	-7.6
868	H/Z	1.0	090	39.9		46.5	-6.6
746	V/Z	1.1	000	39.8		46.5	-6.7
786	V/Z	1.1	000	40.5		46.5	-6.0
868	V/Z	1.1	180	41.0		46.5	-5.5

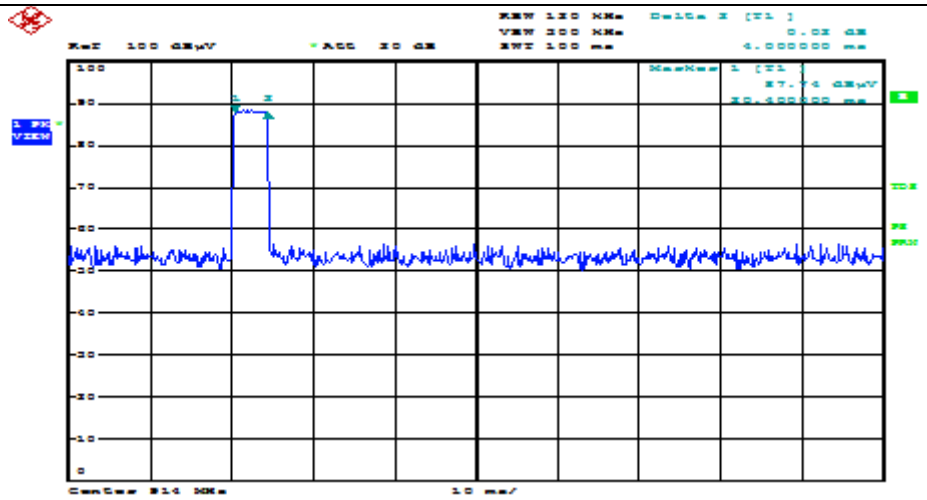
Comparing to the limit defined in Sec. 15.209 &RSS-210, emissions below the limit by 20dB were not recorded.



20dB Bandwidth Plot



99% Bandwidth Plot



Duty Cycle Plot

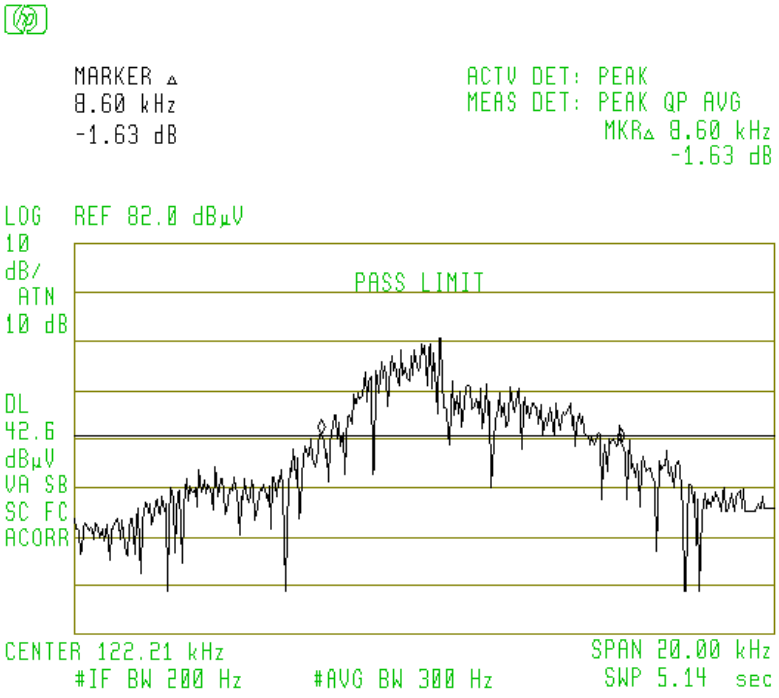
5.4 125KHz Transmission Radiated Test Data

EUT is powered by battery 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)
0.123	Loop	1.0	000	99.8		105.6	-5.8
0.249	Loop	1.0	000	66.9		99.5	-32.6
0.371	Loop	1.0	020	62.3		96.1	-33.8
0.497	Loop	1.0	020	65.2		73.6	-8.4
0.634	Loop	1.0	040	61.7		70.9	-9.2

(1) The limit for emissions per Sec. 15.209 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