ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test Report No.	**: E136R-009**
AGR No.	**: A131A-064**
Applicant	**: IDP Corp., Ltd.**
Address	**: (Guro-dong, Buycksan digital valley 7), 601, 50, Digital-ro33-gil, Guro-gu, Seoul, South Korea**
Manufacturer	**: IDP Corp., Ltd.**
Address	**: (Guro-dong, Buycksan digital valley 7), 601, 50, Digital-ro33-gil, Guro-gu, Seoul, South Korea**
Type of Equipment	**: Card Printer**
FCC ID	**: VU2-SMART-50L**
Model Name	**: SMART-50L**
Serial number	**: N/A**
Total page of Report	**: 37 pages (including this page)**
Date of Incoming	**: May 13, 2013**
Date of Issuing	**: June 07, 2013**

SUMMARY

The equipment complies with the requirements of ***FCC CFR 47 PART 15 SUBPART C, SECTION 15.225***

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: Ki-Hong, Nam / Senior Engineer, ONETECH Corp.

Reviewed by: Y. K. Kwon / Exe. Managing Director, ONETECH Corp.

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EMC Testing Div : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

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Revision History

Issue Report No.	Issued Date	Revisions	Effect Section
E136R-009	June 07, 2013	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

-. APPLICANT : IDP Corp., Ltd.

-. ADDRESS : (Guro-dong, Buycksan digital valley 7), 601, 50, Digital-ro33-gil, Guro-gu, Seoul, South Korea

-. CONTACT PERSON : Kim yong tae / Deputy General Manager

-. TELEPHONE NO : +82-02-6099-3724

-. FCC ID : VU2-SMART-50L

-. MODEL NO/NAME : SMART-50L

-. SERIAL NUMBER : N/A

-. DATE : June 07, 2013

DEVICE TYPE	DXX - Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	Card Printer- Intentional Radiator
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2009
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C, Section 15.225
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	None
FINAL TEST WAS CONDUCTED ON	10 m Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The IDP Corp., Ltd., Model SMART-50L (referred to as the EUT in this report) is an Card Printer, which has function for printer and laminator with 13.56 MHz RF board for detection cartridge in the printer. Also the EUT has 2 same RF boards with each antenna for printer and laminator and the power of the EUT shall be supplied by 2 AC/DC Adapters. Also the EUT has USB port for making communication with a personal computer, so the test was performed, but the report for this portion will be issued with another test report acc. to DOC procedure. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Fixed Device
MODULATION	ASK
TRANSMITTING FREQUENCY	13.558 5 MHz
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1 MHz)	13.56 MHz, 12 MHz
ANTENNA TYPE	2 * PCB Antennas
USED AC/DC ADAPTER	Output: DC 24 V, 2.7 A Model No: STD-2427P Manufacturer: Adapter Technology Co., Ltd
NUMBER OF LAYERS	6 Layers

2.2 Model Differences:

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
SMART-50L	Basic Model	☑
EDIsecure DCP350 Laminator	The model is identical to basic model except for the external case design difference.	☐

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 15.225.

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2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2009. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site is located at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do and 10 m Semi Anechoic Chamber (SAC) and conducted measurement facilities are located at 301-14, Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013 under APEC TEL MAR between the RRA and the FCC.

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Printer Main Board	IDP Co.,Ltd	Smart Board V 0.57	N/A
Laminator Main Board	IDP Co.,Ltd	Laminate Main Board V 0.3	N/A
RF Tag Board for Printer	IDP Co.,Ltd	RF Tag Board V 0.2	N/A
RF Tag Board for Laminator	IDP Co.,Ltd	RF Tag Board V 0.2	N/A
LCD Board	IDP Co.,Ltd	LCD Board V 0.2	N/A

3.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
SMART-50L	IDP Corp., Ltd.	Card Printer (EUT)	-
STD-2427P	Adapter Technology Co., Ltd.	Adapter (2ea)	EUT

3.3 Mode of operation during the test

-. The EUT has 2 same 13.56 MHz RF boards for printer and laminator for making IC Card and the power of the EUT shall be supplied by 2 same AC/DC adapters, so the test was performed for each operating mode with each AC/DC adapter and program was used for making continuous transmission mode during the test.

3.4 Equipment Modifications

-. None

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3.5 Configuration of Test System

Line Conducted Test : The EUT was connected to adaptor and the power of adaptor was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2009 to determine the worse operating conditions.

Radiated Emission Test : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2009 to determine the worse operating conditions. The radiated emissions measurements were performed on the 10 m Semi Anechoic Chamber.

For frequencies from 150 kHz to 30 MHz measurements were made of the magnetic H field. The measuring antenna is an electrically screened loop antenna.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and maximum emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

3.6 Antenna Requirement

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The transmitter antenna of the EUT is a PCB pattern antenna so there is no consideration of replacement by the user.

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4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Continuous Transmitting Mode		The Worse operating condition (Please check one only)
Printing Mode (RF Board #1)	With Adapter #1	X
	With Adapter #2	
Laminating Mode (RF Board #2)	With Adapter #1	
	With Adapter #2	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Continuous Transmitting Mode	The Worse operating condition (Please check one only)
Printing Mode (RF Board #1)	X
Laminating Mode (RF Board #2)	

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5. FINAL RESULT OF MEASURMENT

5.1 Conducted Emission Test

5.1.1 Test data for Printing Mode (RF Board #1)

5.1.1.1 Used AC/DC Adapter: Adapter #1 for Printer

Humidity Level : 44 % R.H. Temperature: 23 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Card Printer Date: May 27, 2013

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
0.15	N	41.58	66.00	24.42
0.38	N	34.84	58.39	23.55
0.82	N	35.66	56.00	20.34
13.56	N	44.10	60.00	15.90
22.75	H	40.03	60.00	19.97
22.76	N	39.75	60.00	20.25
Frequency (MHz)	**Line**	**Average (dBμV)**		**Margin (dB)**
		Emission level	**Limits**	
-	-	-	-	-
-	-	-	-	-

Line Conducted Emissions Tabulated Data

Remark: “H”: Hot Line, “N”: Neutral Line.

See next page for an overview sweep performed with quasi-peak and average detector.

Tested by: Hong-Kyu, Lee/ Engineer

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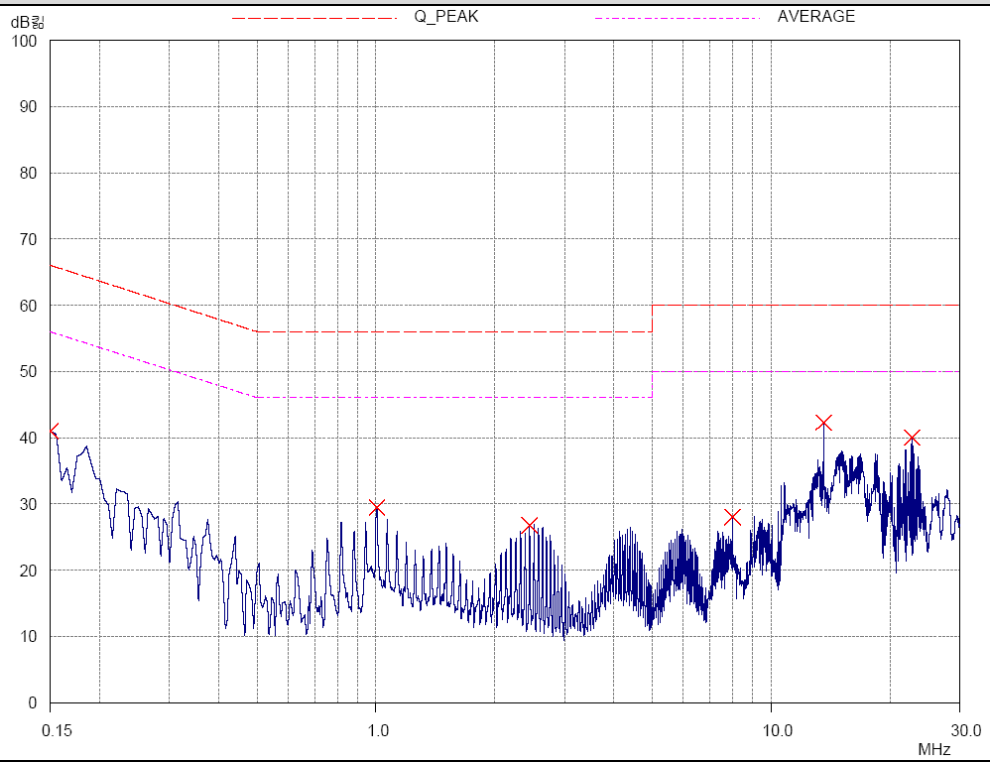
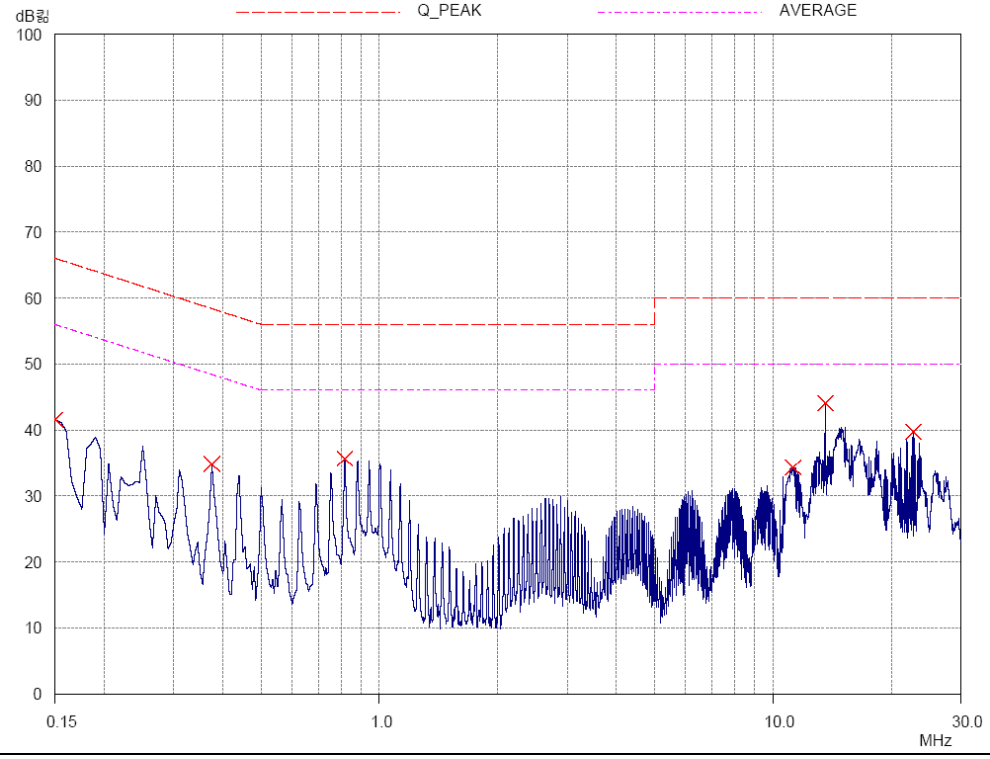
Graphical representation of Conducted Emission



HOT LINE



NEUTRAL LINE

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5.1.1.2 Used AC/DC Adapter: Adapter #2 for Laminator

Humidity Level : 44 % R.H. Temperature: 23 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Card Printer Date: May 27, 2013

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
0.19	N	38.30	64.26	25.96
0.94	N	32.18	56.00	23.82
1.00	H	30.06	56.00	25.94
10.60	N	39.34	60.00	20.66
10.61	H	40.55	60.00	19.45
21.79	H	40.29	60.00	19.71
Frequency (MHz)	**Line**	**Average (dBμV)**		**Margin (dB)**
		Emission level	**Limits**	
-	-	-	-	-
-	-	-	-	-

Line Conducted Emissions Tabulated Data

Remark: “H”: Hot Line, “N”: Neutral Line.

See next page for an overview sweep performed with quasi-peak and average detector.

Tested by: Hong-Kyu, Lee/ Engineer

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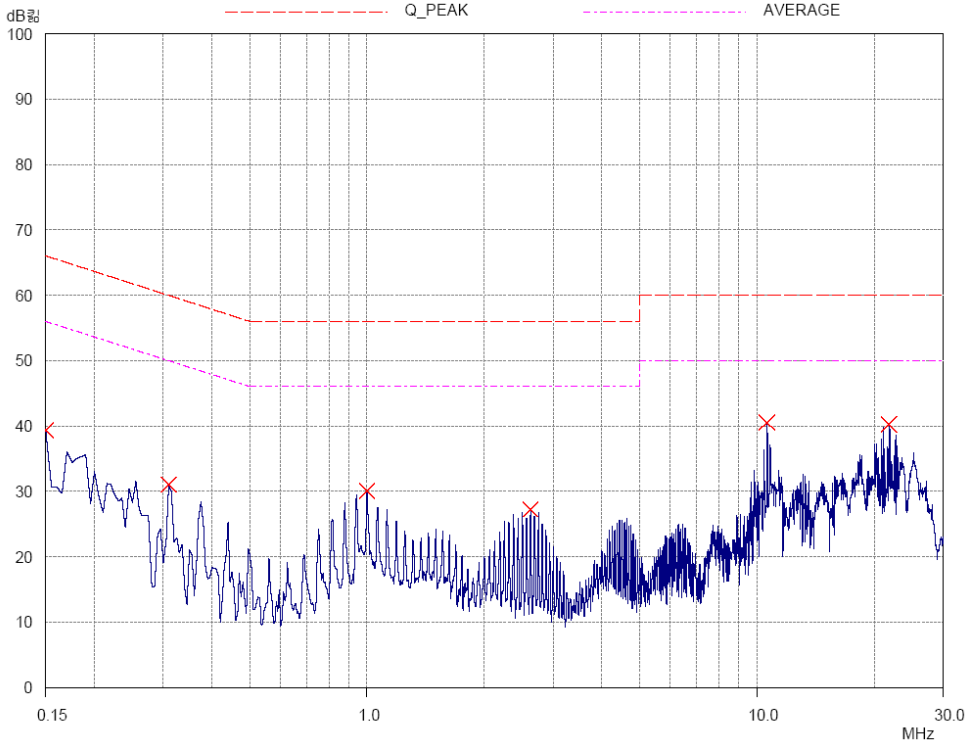
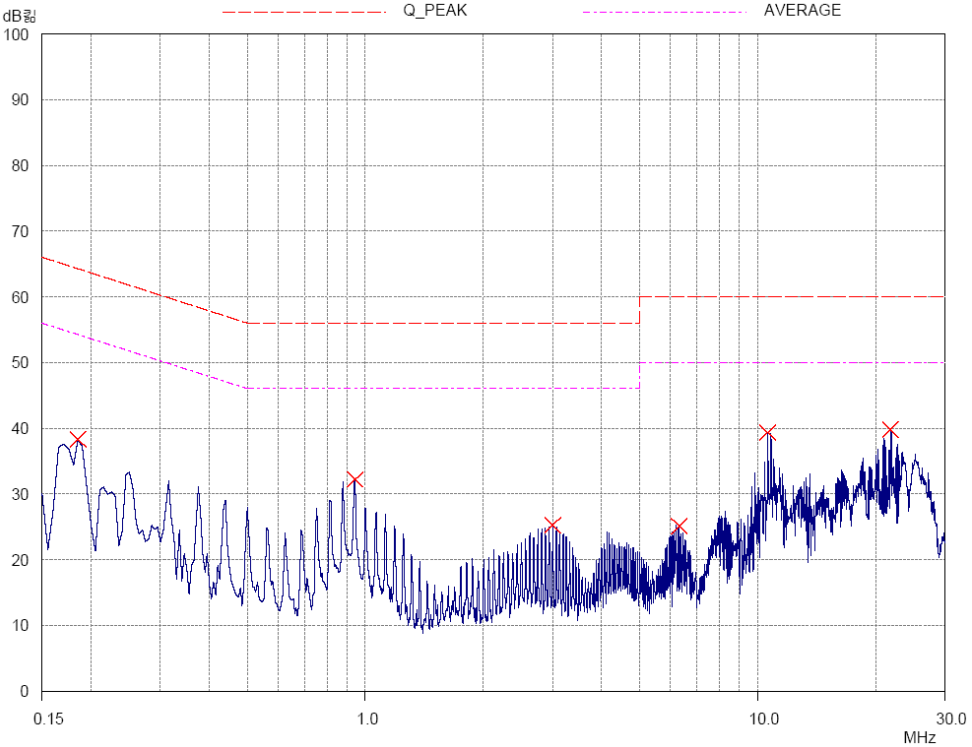
Graphical representation of Conducted Emission



HOT LINE



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5.1.2 Test data for Laminating Mode (RF Board #2)

5.1.2.1 Used AC/DC Adapter: Adapter #1 for Printer

Humidity Level : 44 % R.H. Temperature: 23 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Card Printer Date: May 27, 2013

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
0.94	N	32.41	56.00	23.59
10.61	H	40.07	60.00	19.93
10.80	N	38.16	60.00	21.84
18.51	N	35.98	60.00	24.02
21.79	N	39.42	60.00	20.58
21.80	H	39.96	60.00	20.04
Frequency (MHz)	**Line**	**Average (dBμV)**		**Margin (dB)**
		Emission level	**Limits**	
-	-	-	-	-
-	-	-	-	-

Line Conducted Emissions Tabulated Data

Remark: “H”: Hot Line, “N”: Neutral Line.

See next page for an overview sweep performed with quasi-peak and average detector.

Tested by: Hong-Kyu, Lee/ Engineer

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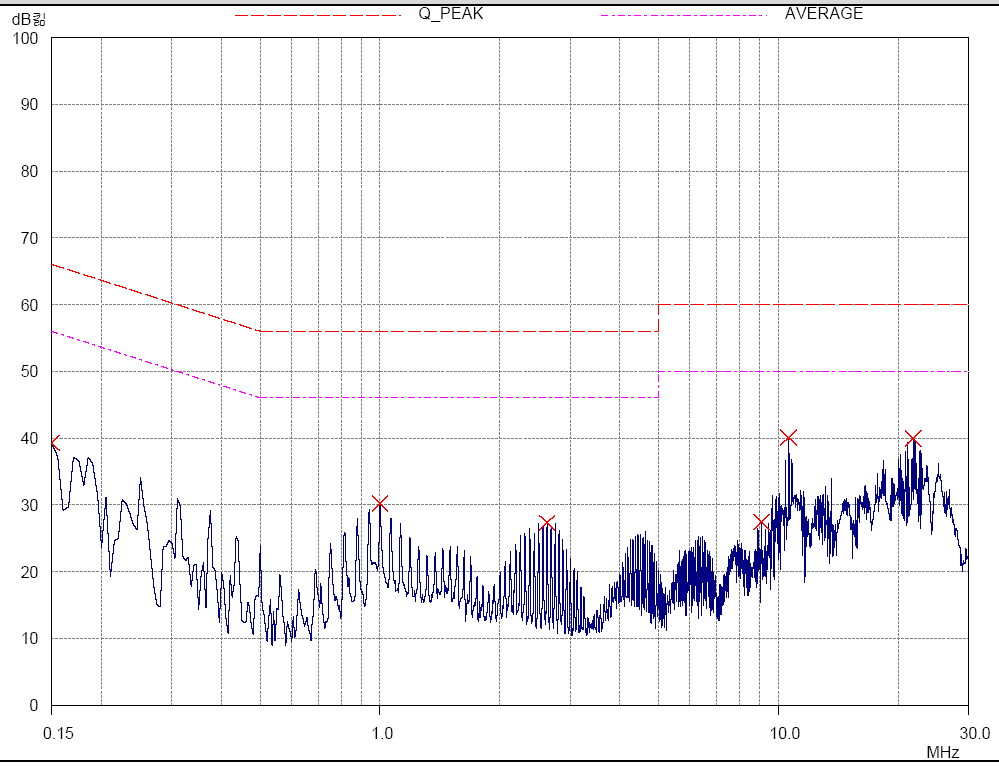
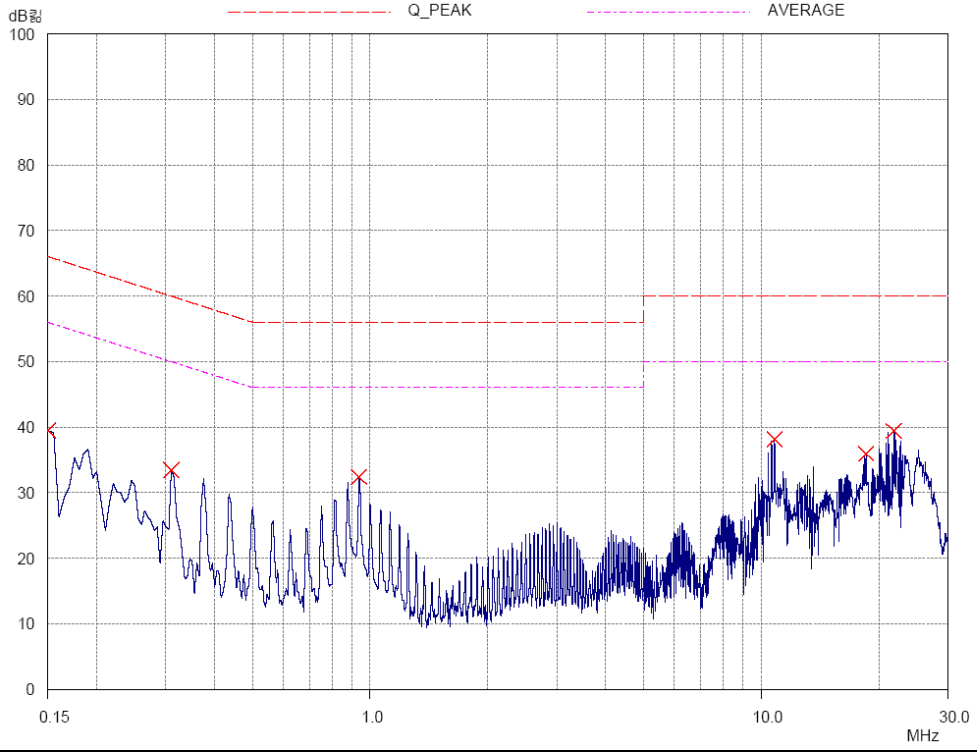
Graphical representation of Conducted Emission



HOT LINE



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5.1.2.2 Used AC/DC Adapter: Adapter #2 for Laminator

Humidity Level : 44 % R.H. Temperature: 23 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.207(a)

Result : PASSED

EUT : Card Printer Date: May 27, 2013

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBμV)		Margin (dB)
		Emission level	Q.P Limits	
0.25	N	37.69	61.76	24.07
0.82	N	35.70	56.00	20.30
1.07	H	33.80	56.00	22.20
2.57	H	32.83	56.00	23.17
13.56	H	44.04	60.00	15.96
22.76	H	40.14	60.00	19.86
Frequency (MHz)	**Line**	**Average (dBμV)**		**Margin (dB)**
		Emission level	**Limits**	
-	-	-	-	-
-	-	-	-	-

Line Conducted Emissions Tabulated Data

Remark: "H": Hot Line, "N": Neutral Line.

See next page for an overview sweep performed with quasi-peak and average detector.

Tested by: Hong-Kyu, Lee/ Engineer

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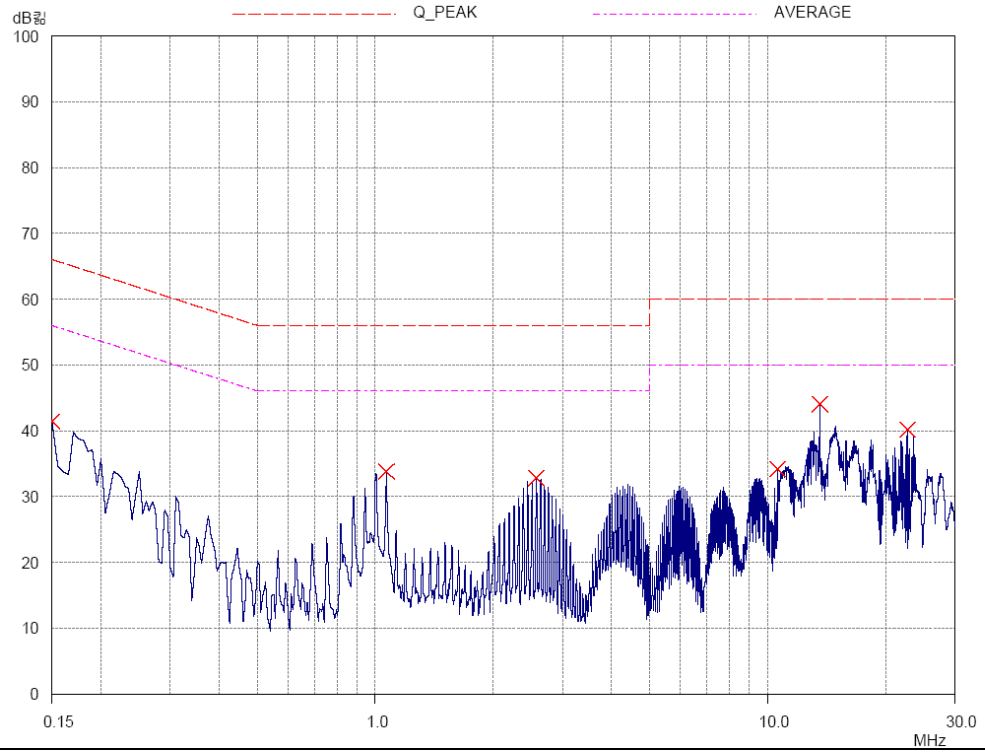
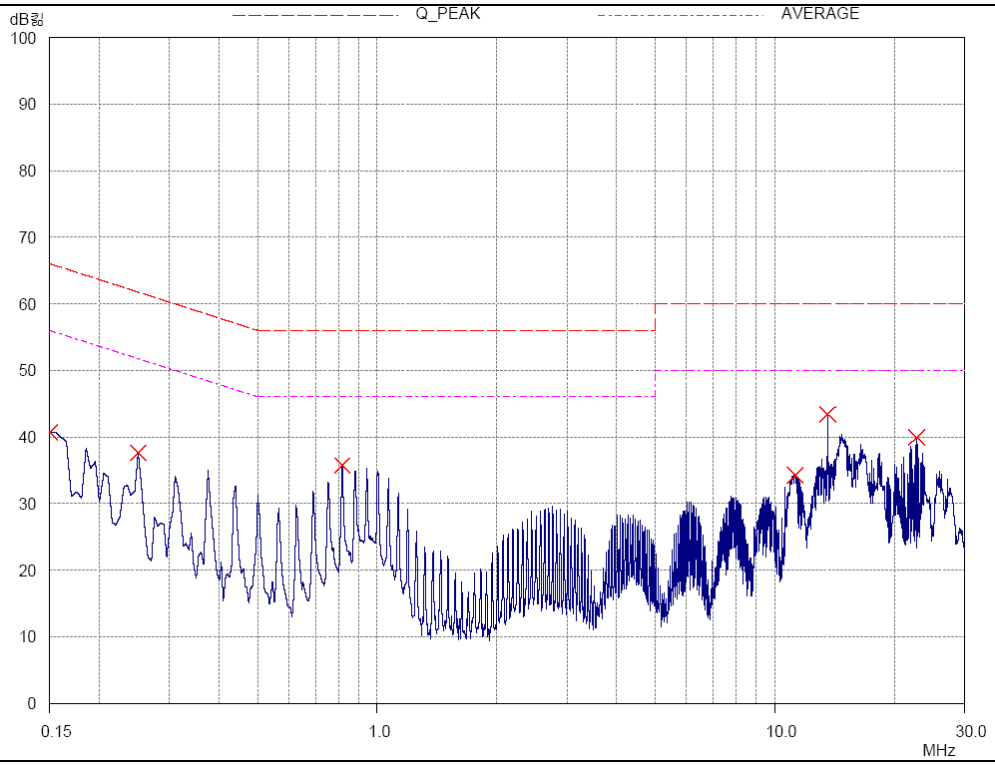
Graphical representation of Conducted Emission



HOT LINE



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5.2 Radiated Emission Test

5.2.1 Operation frequency band: (13.553 ~ 13.567) MHz

5.2.1.1 Test data for Printing Mode (RF Board #1)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : PART 15, SUBPART C, SECTION 15.225(a)

Type of Test : Low Power Communication Device Transmitter

Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Distance : 3 m

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitud (dBμV)	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.558 5	28.49	H	18.4	0.3	47.19	124	76.81
13.558 5	21.14	V	18.4	0.3	39.84	124	84.16

Remark. The EUT was tested at 3 m, so conversation factor was included at above limit.

Tested by: Hong-Kyu, Lee/ Engineer

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5.2.1.2 Test data for Laminating Mode (RF Board #2)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : PART 15, SUBPART C, SECTION 15.225(a)

Type of Test : Low Power Communication Device Transmitter

Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Distance : 3 m

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amplitud (dBμV)	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.558 5	27.74	H	18.4	0.3	46.44	124	77.56
13.558 5	21.08	V	18.4	0.3	39.78	124	84.22

Remark. The EUT was tested at 3 m, so conversation factor was included at above limit.

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5.2.2 Operation frequency band: Below 13.553 MHz and above 13.567 MHz

5.2.2.1 Test data for Printing Mode (RF Board #1)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

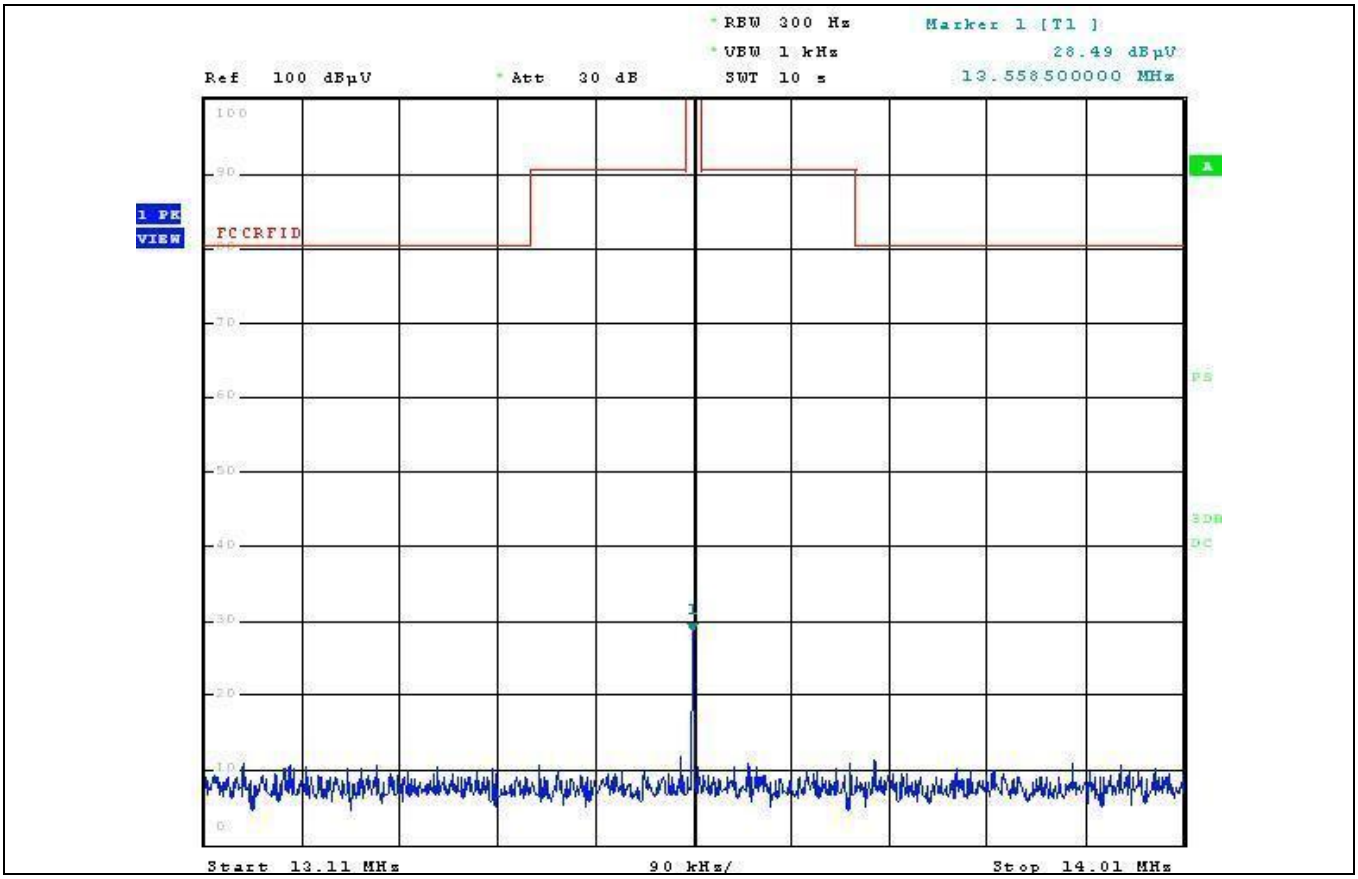
Limits apply to : PART 15, SUBPART C, SECTION 15.225(b) and (c)

Type of Test : Low Power Communication Device Transmitter

Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode



Acc. to above test data, the field strength level of 13. 558 5 MHz is 47.19 dBuV/m and the worst limit subject to 15.225 (b) and (c) is 80.5 dBuV/m, so the EUT meets the requirement.

Tested by: Hong-Kyu, Lee/ Engineer

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5.2.2.2 Test data for Laminating Mode (RF Board #2)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

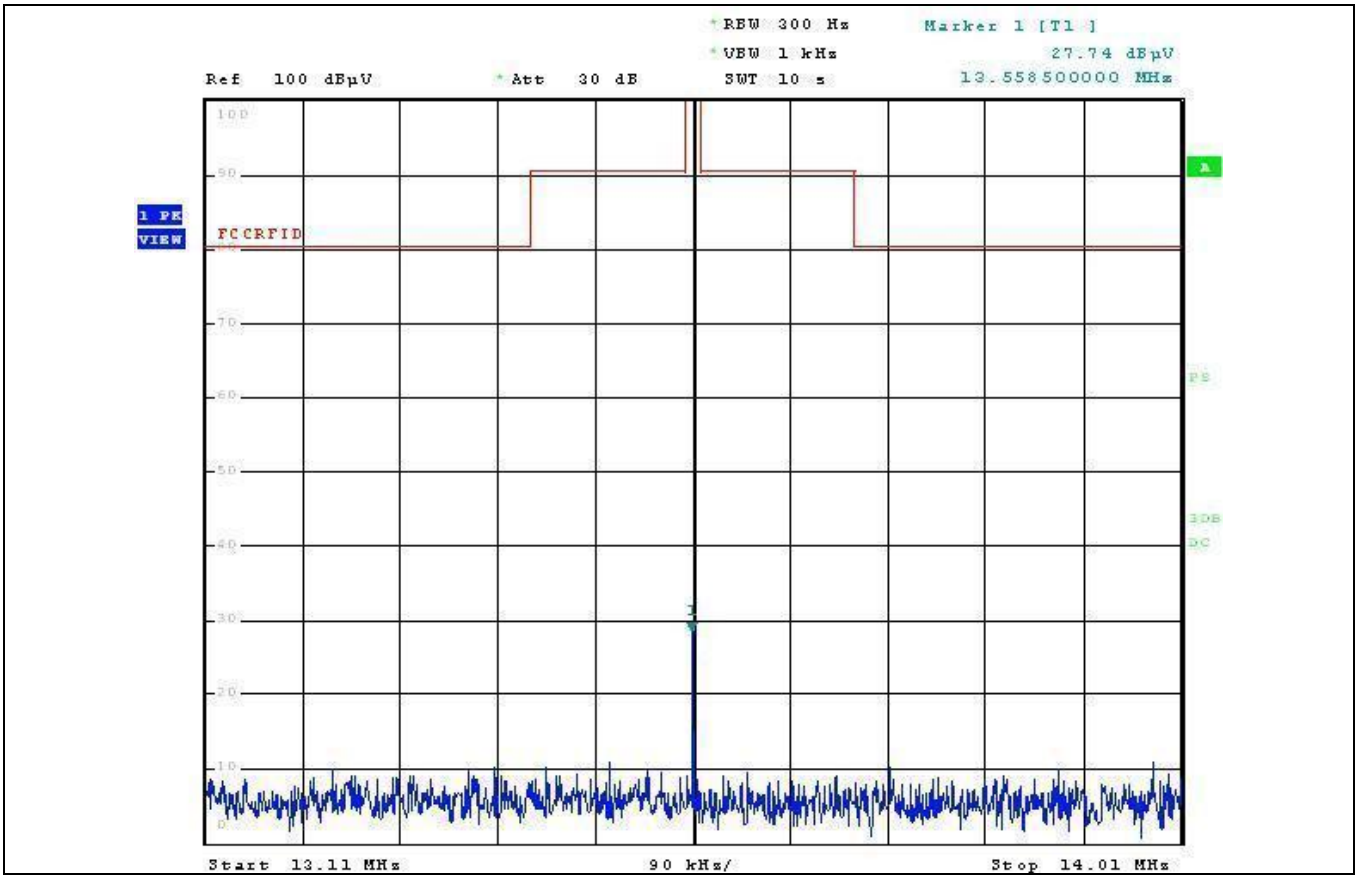
Limits apply to : PART 15, SUBPART C, SECTION 15.225(b) and (c)

Type of Test : Low Power Communication Device Transmitter

Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode



Acc. to above test data, the field strength level of 13. 558 5 MHz is 46.44 dBuV/m and the worst limit subject to 15.225 (b) and (c) is 80.5 dBuV/m, so the EUT meets the requirement.

Tested by: Hong-Kyu, Lee/ Engineer

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5.3 Spurious Emission Test

5.3.1 Spurious Radiated Emission below 1 GHz

5.3.1.1 Test data for Printing Mode (RF Board #1)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225(d)

Type of Test : Low Power Communication Device Transmitter

Frequency range : 30 MHz ~ 1 000 MHz

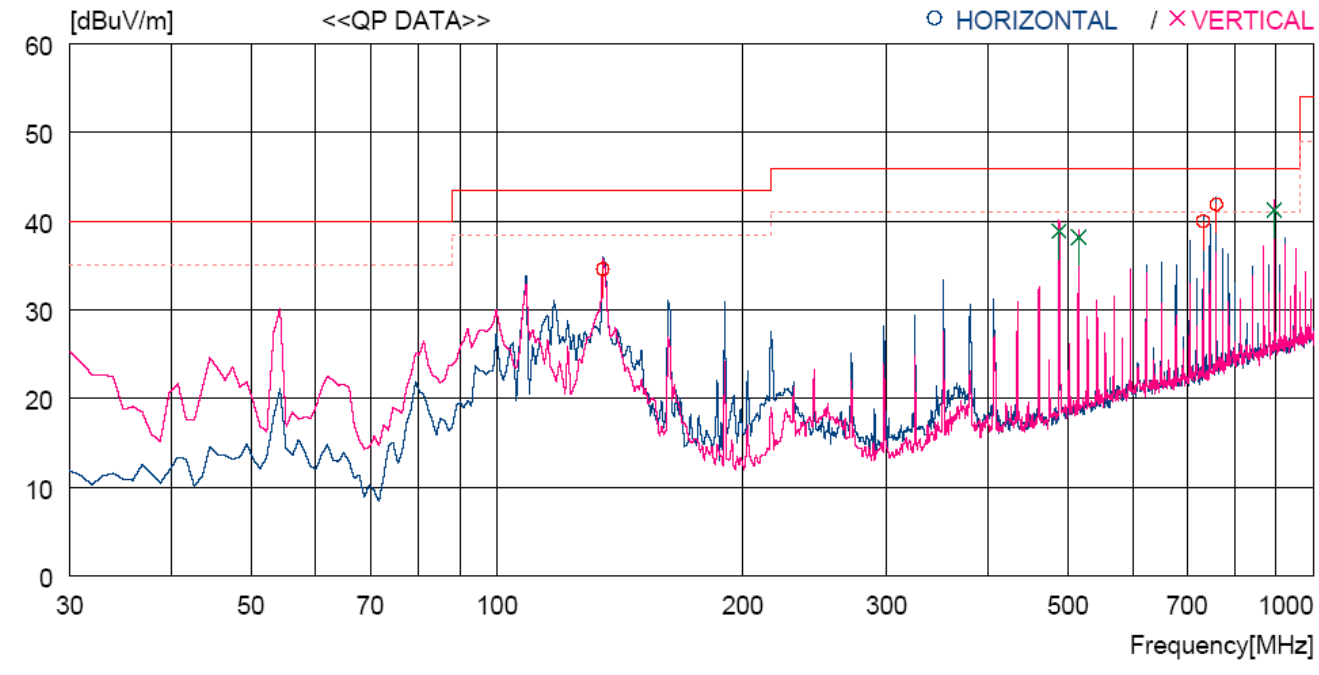
Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Distance : 3 m

Graphical representation of Radiated Disturbance



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Tabulated Results for Radiated Disturbance

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	134.760	55.3	9.8	2.5	33.0	34.6	43.5	8.9	200	359
2	732.274	45.8	21.2	5.7	32.7	40.0	46.0	6.0	100	42
3	759.433	47.1	21.6	5.8	32.6	41.9	46.0	4.1	100	55
----- Vertical ------										
4	487.841	49.1	18.3	4.6	33.1	38.9	46.0	7.1	100	359
5	515.001	47.9	18.7	4.7	33.1	38.2	46.0	7.8	100	53
6	895.229	43.8	23.3	6.3	32.1	41.3	46.0	4.7	100	359

Remark: Margin (dB) = Limit – Result and Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain

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5.3.1.2 Test data for Laminating Mode (RF Board #2)

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225(d)

Type of Test : Low Power Communication Device Transmitter

Frequency range : 30 MHz ~ 1 000 MHz

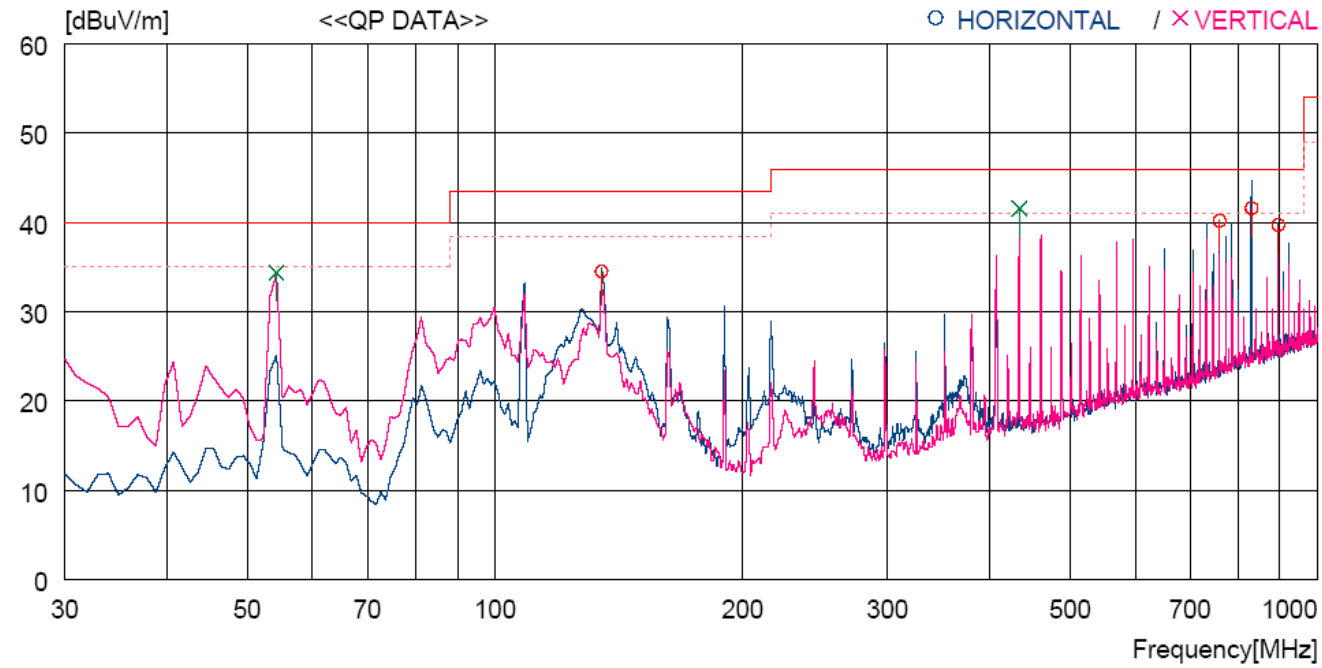
Result : PASSED

EUT : Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Distance : 3 m

Graphical representation of Radiated Disturbance



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Tabulated Results for Radiated Disturbance

No.	FREQ	READING QP	ANT FACTOR	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal ------										
1	134.760	55.2	9.8	2.5	33.0	34.5	43.5	9.0	200	0
2	759.433	45.4	21.6	5.8	32.6	40.2	46.0	5.8	100	359
3	895.229	42.2	23.3	6.3	32.1	39.7	46.0	6.3	200	0
4	831.211	45.4	22.6	6.0	32.4	41.6	46.0	4.4	400	0
----- Vertical ------										
5	54.250	51.2	14.7	1.6	33.1	34.4	40.0	5.6	100	231
6	433.521	52.9	17.4	4.3	33.0	41.6	46.0	4.4	100	0

Remark: Margin (dB) = Limit – Result and Result = Reading Quasi-Peak + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain

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5.3.2 Test Data for Below 30 MHz

5.3.2.1 Test data for Printing Mode (RF Board #1)

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225(d)

Type of Test : Low Power Communication Device Transmitter

Frequency range : 9 kHz ~ 30 MHz

Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

Result : PASSED

EUT :Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

Tested by: Hong-Kyu, Lee/ Engineer

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5.3.2.2 Test data for Laminating Mode (RF Board #2)

Humidity Level : 43 % R.H. Temperature: 21 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.225(d)

Type of Test : Low Power Communication Device Transmitter

Frequency range : 9 kHz ~ 30 MHz

Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)

Result : PASSED

EUT :Card Printer Date: May 28, 2013

Operating Condition : Transmitting Mode

Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									

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6. 20 dB BANDWIDTH

6.1 Operating environment

Temperature : 23 ℃

Relative humidity : 44 % R.H.

6.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 10 kHz, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.

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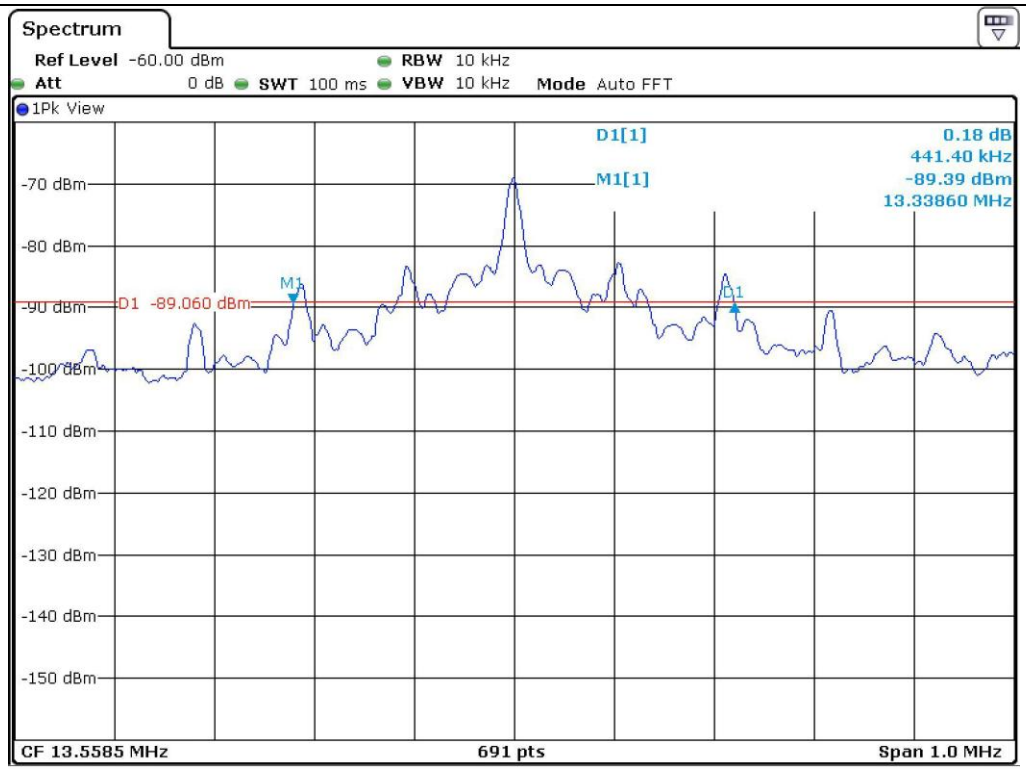
6.3 Test data for Printing Mode (RF Board #1)

-. Test Date : May 27, 2013

-. Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.215(c)

Operating Freq. (MHz)	Measured Value (kHz)	Assigned Operating Frequency Band (kHz)	Result
13.558 5	441.4	900	**PASS**



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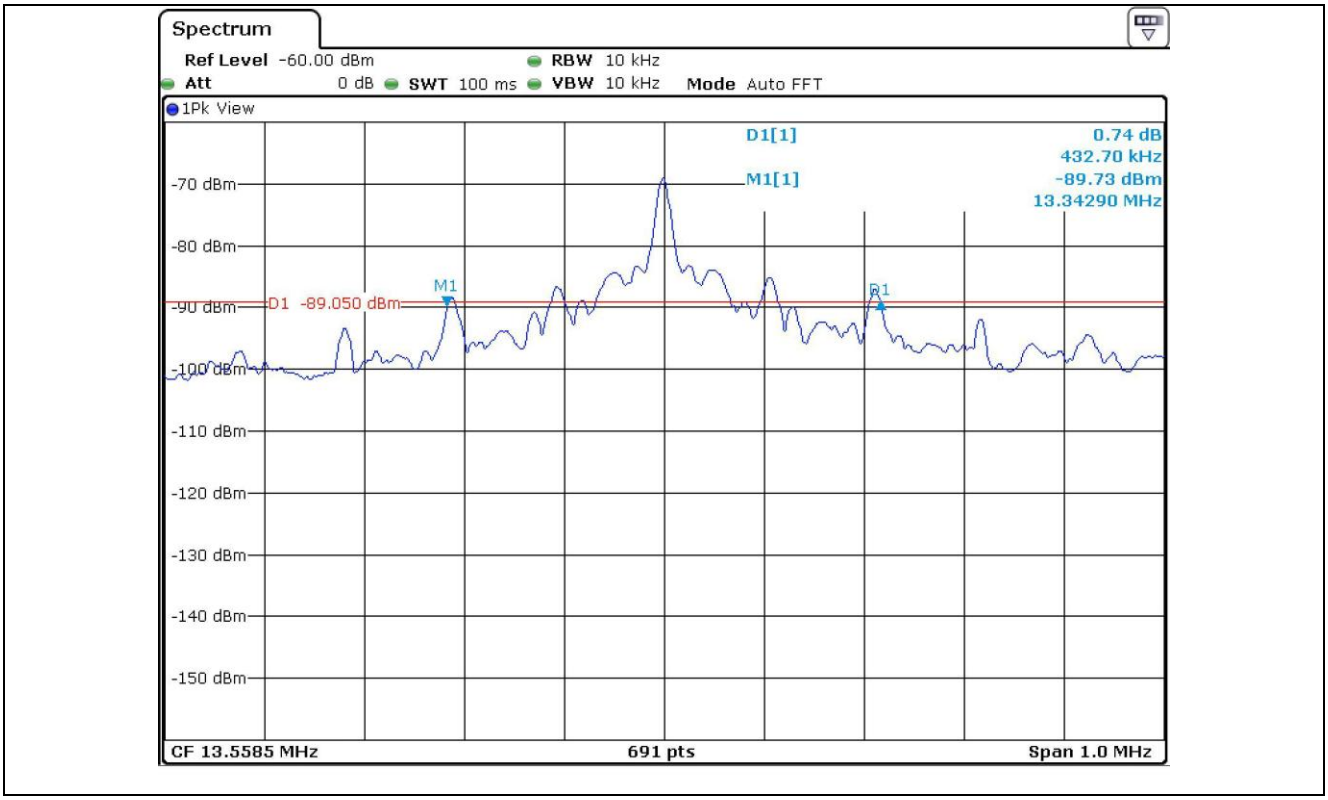
6.4 Test data for Laminating Mode (RF Board #2)

-. Test Date : May 27, 2013

-. Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.215(c)

Operating Freq. (MHz)	Measured Value (kHz)	Assigned Operating Frequency Band (kHz)	Result
13.558 5	432.7	900	**PASS**



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7. FREQUENCY STABILITY WITH TEMPERATURE VARIATION

7.1 Operating environment

Temperature : 23 ℃

Relative humidity : 44 % R.H.

7.2 Test set-up

Turn EUT off and set chamber temperature to -20 ℃ and then allow sufficient time (approximately 20 to 30 minutes after chamber reach the assigned temperature) for EUT to stabilize. Turn ON EUT and measure the EUT operating frequency and then turn off the EUT after the measurement. The temperature in the chamber was raised 10 ℃ step from -20 ℃ to +50℃. Repeat above method for frequency measurements every 10 ℃ step and then record all measured frequencies on each temperature step.

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7.3 Test data for Printing Mode (RF Board #1)

-. Test Date : May 27, 2013

-. Result : PASSED

Temperature (˚C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
-20	13 558 500	13 558 595	1 260.85	± 1 355.85
-10		13 558 584	1 271.85	
0		13 558 568	1 287.85	
10		13 558 551	1 304.85	
20		13 558 542	1 313.85	
30		13 558 521	1 334.85	
40		13 558 502	1 353.85	
50		13 558 474	1 329.85	

7.4 Test data for Laminating Mode (RF Board #2)

-. Test Date : May 27, 2013

-. Result : PASSED

Temperature (˚C)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
-20	13 558 500	13 558 612	1 243.85	± 1 355.85
-10		13 558 599	1 256.85	
0		13 558 586	1 269.85	
10		13 558 578	1 277.85	
20		13 558 561	1 294.85	
30		13 558 542	1 313.85	
40		13 558 511	1 344.85	
50		13 558 488	1 343.85	

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8. FREQUENCY STABILITY WITH VOLTAGE VARIATION

8.1 Operating environment

Temperature : 23 ℃

Relative humidity : 44 % R.H.

8.2 Test set-up

An external DC power supply was connected to the input of the EUT. The voltage of EUT set to 115 % of the nominal value and then was reduced to 85 % of nominal voltage. The output frequency was recorded at each step.

8.3 Test data for Printing Mode (RF Board #1)

8.3.1 USED AC/DC Adapter: Adapter #1 for Printer

-. Test Date : May 27, 2013

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
126.5(115 %)	13 558 500	13 558 551	1 304.85	± 1 355.85
110(100 %)		13 558 542	1 313.85	
93.5(85 %)		13 558 524	1 331.85	

8.3.2 USED AC/DC Adapter: Adapter #2 for Laminator

-. Test Date : May 27, 2013

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
126.5(115 %)	13 558 500	13 558 574	1 281.85	± 1 355.85
110(100 %)		13 558 561	1 294.85	
93.5(85 %)		13 558 552	1 303.85	

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8.4 Test data for Laminating Mode (RF Board #2)

8.4.1 USED AC/DC Adapter: Adapter #1 for Printer

-. Test Date : May 27, 2013

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
126.5(115 %)	13 558 500	13 558 547	1 308.85	± 1 355.85
110(100 %)		13 558 535	1 320.85	
93.5(85 %)		13 558 504	1 351.85	

8.4.2 USED AC/DC Adapter: Adapter #2 for Laminator

-. Test Date : May 27, 2013

-. Result : PASSED

Voltage (Vac)	Carrier Freq. (Hz)	Measured Freq. (Hz)	Margin (Hz)	Limit (Hz)
126.5(115 %)	13 558 500	13 558 553	1 302.85	± 1 355.85
110(100 %)		13 558 542	1 313.85	
93.5(85 %)		13 558 537	1 318.85	

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9. FIELD STRENGTH CALCULATION

Receiver readings are compared to the specification limit correcting for antenna factor, pre-amplifier gain and cable losses.

+	Meter reading	(dBμV)
+	Cable Loss	(dB)
+	Antenna Factor	(dB/m)
-	Amplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

	Specification Limit	(dBuV/m)
-	Corrected Reading	(dBuV/m)
=	dB Relative to Limit	(± dB)

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10. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	FEB/13	12MONTH	■
2.	Test Receiver	R/S	ESU	100261	SEP/13	12MONTH	■
3.	Test receiver	R/S	ESHS10	834467/007	JUN/13	12MONTH	■
4.	Spectrum analyzer	R/S	FSV30	101372	MAY/13	12MONTH	■
5.	Amplifier	Sonoma Instrument	310N	312544	MAY/13	12MONTH	■
6.	Amplifier	Sonoma Instrument	310N	312545	MAY/13	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163-202	DEC/12	24MONTH	■
8.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-419	FEB/12	24MONTH	■
9.	Controller	Innco System	CO2000	619/27030611/L	N/A	N/A	■
10.	LISN	EMCO	3825/2	9109-1867	JUN/13	12MONTH	■
				9109-1869	JUN/13		-
		Schwarzbeck	NSLK 8126	8126-404	JUN/13		-
		Schwarzbeck	NSLK 8128	8128-216	JUN/13		■
11.	Turn Table	Innco System	DT3000	930611	N/A	N/A	■
12.	Antenna Master	Innco System	MA4000-EP	3320611	N/A	N/A	■
13.	Antenna Master	Innco System	MA4000-EP	3350611	N/A	N/A	■
14.	Loop Antenna	R/S	HFH2-Z2	889 285 / 26	AUG/12	24MONTH	■
15.	Frequency Counter	HP	53152A	US39270295	DEC/12	12MONTH	■
16.	Chamber	Sam Kun	SSE-43CI-A	060712	MAY/13	12MONTH	■
17.	DC Power Supply	Digital Electronics	DRP-305DN	4030191	SEP/12	12MONTH	■

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