



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

NFC PRINTER ACCESSORY (HP CODE NAME: REQUIN)

MODEL NUMBER: RSVLD-1301

**FCC ID: B94RSVLD1301
IC: 466F-RSVLD1301**

REPORT NUMBER: 13U14847-3A

ISSUE DATE: JUNE 11, 2013

Prepared for
**HEWLETT-PACKARD COMPANY
8000 FOOTHILLS BLVD.
ROSEVILLE, CA 95747, U.S.A.**

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NVLAP LAB CODE 200065-0

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--	06/11/13	Initial Issue	G. Quizon
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HEWLETT-PACKARD COMPANY
8000 Foothills Blvd.
Roseville, CA 95747, U.S.A.

EUT DESCRIPTION: NFC PRINTER ACCESSORY (HP CODE NAME: REQUIN)

MODEL: RSVLD-1301

SERIAL NUMBER: CN3347009F (RADIATED AND AC LC EMISSION W/ ANTENNA, ANTENNA PORT CONDUCTED)

CN33470023 (AC LC EMISSIONS CONDUCTED W/ 50 OHM LOAD)

Unit #8 (ANTENNA Port CONDUCTED)

DATE TESTED: FEBRUARY 11-15, 2013 (Frequency Stability and 99%)
JUNE 06 -11, 2013 (Radiated and Conducted Emissions)

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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UL VERIFICATION SERVICES INC.

Tested By:



THANH NGUYEN
WISE EMC ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 13.56 MHz NFC printer accessory module intended for use with the LaserJet family of H.P. printers.

5.2. MAXIMUM FUNDAMENTAL E-FIELD

Operating Frequency (MHz)	Mode	Fundamental E-Field (dBuV/m)	Measurement Distance (m)
13.56	Continuous TX/RX	62.29	10.00

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a 30mm x 40mm, 4-turn magnetic loop antenna.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was "Requin_12022013".

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT functions on a single channel and fixed output amplitude. There is only one channel and output level setting.

The receiver in the EUT is collocated with the transmitter that is continuously transmitting; the receiver was tested along with the transmitter in operating mode. The EUT does not have a "Standby" mode.

5.6. MODIFICATIONS

No modifications were made during testing.

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
ESA-E Spectrum Analyzer	Agilent / HP	E4407B	C01098	04/04/13	04/04/14
Antenna, Loop, 30 MHz	EMCO	6502	C00593	02/20/13	02/20/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/12	10/21/13
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/13	02/13/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/13	01/16/14
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/18/12	08/18/13
Multimeter, handheld	Extech	410	F00082	07/31/12	07/31/13
Digital Thermometer	Tektronix	DTM920	F00006	06/12/13	06/12/14
Temperature Chamber	Tenney Engineering	TJR-A	13916871	05/07/12	05/07/13
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/11	08/08/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/13	01/14/14

7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMIT

§15.225

IC RSS-210, Section 2.6 (Transmitter)

IC RSS-GEN, Section 6 (Receiver)

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

TEST PROCEDURE

ANSI C63.10: 2009

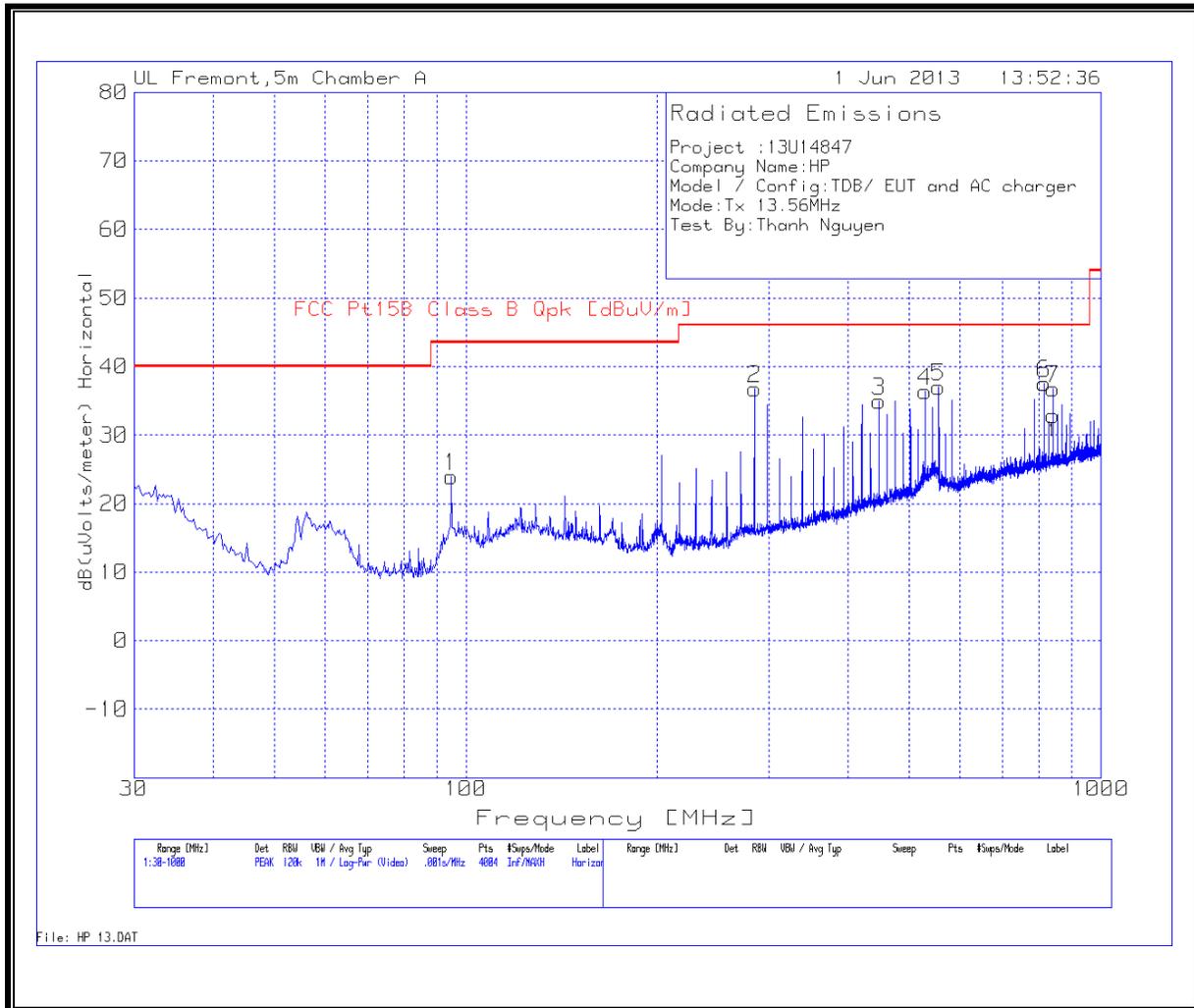
The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 13.56 MHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (1000 MHz).

RESULTS

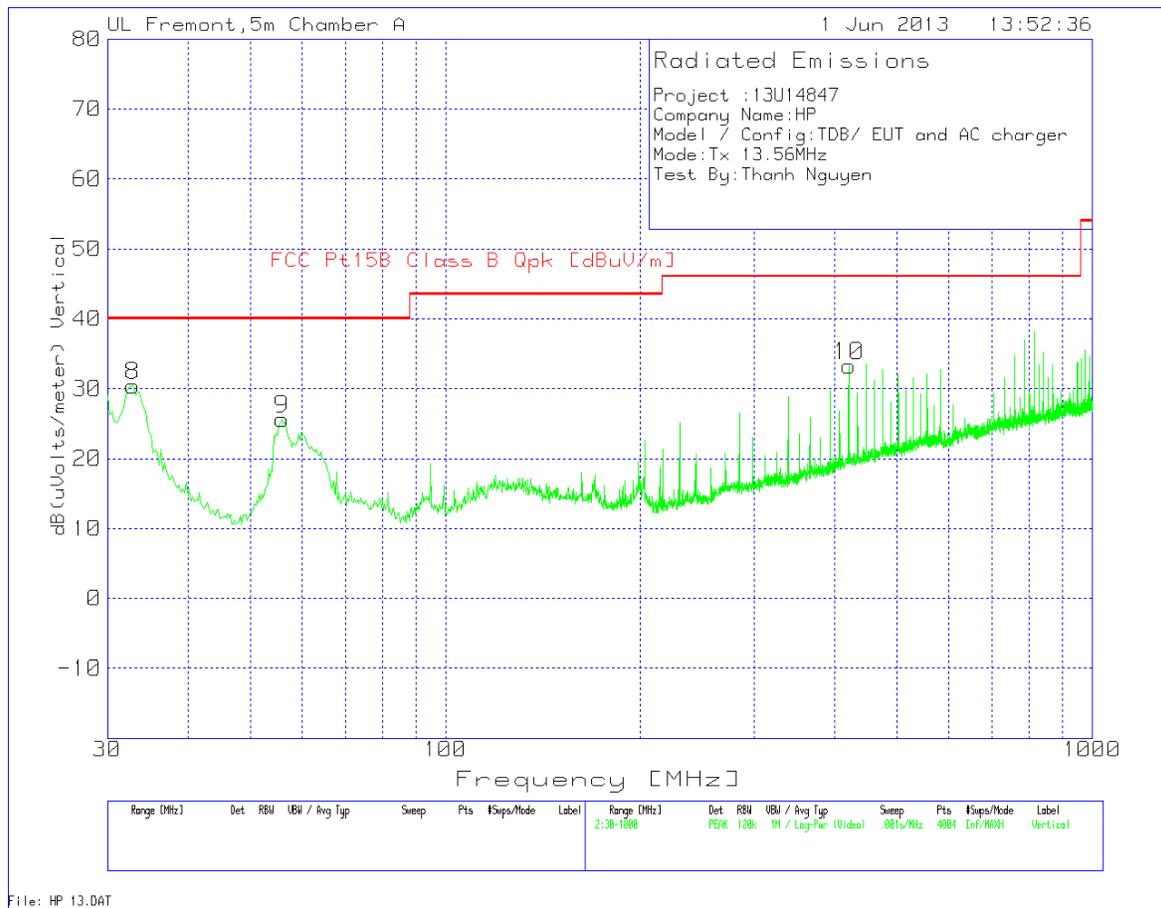
7.2. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

FCC Part 15, Subpart B & C													10 Meter Distance Measurement At Open Field
Company: HP													
Project #: 13U14847													
Model #: RMN RSLVD-1301													
Mode of operation: TX/RX													
Tester: Thanh Nguyen													
Date: 06/1/2013													
Frequency	PK	QP	AV	AF	Distance	PK Corrected Reading	AV Corrected Reading	QP Limit	AV Limit	PK Margin	AV Margin	Notes	
(MHz)	(dBu/V)	(dBu/V)	(dBuV)	dB/m	Correction (dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	(dB)		
Loop Antenna Face On:													
13.56	51.43		N/A	10.56	-19.08	42.91	N/A	84.00	N/A	-41.1	N/A	Fundamental @ 10m Dist	
13.553	48.61		N/A	10.56	-19.08	40.09	N/A	50.48	N/A	-10.4	N/A	13.41-13.553MHz Spurious @ 10m Dist	
13.567	46.46		N/A	10.56	-19.08	37.94	N/A	50.48	N/A	-12.5	N/A	13.41-13.553MHz Spurious @ 10m Dist	
27.12	17.76		N/A	9.046	-19.08	7.73	N/A	30.00	N/A	-22.3	N/A	13.567-13.710 MHz Spurious @ 10m Dist	
Loop Antenna Face Off:													
13.56	51.73		N/A	10.56	-19.08	43.21	N/A	84.00	N/A	-40.8	N/A	Fundamental @ 10m Dist	
13.553	48.85		N/A	10.56	-19.08	40.33	N/A	50.48	N/A	-10.2	N/A	13.41-13.553MHz Spurious @ 10m Dist	
13.567	46.46		N/A	10.56	-19.08	37.94	N/A	50.48	N/A	-12.5	N/A	13.567-13.710 MHz Spurious @ 10m Dist	
27.12	19.42		N/A	9.046	-19.08	9.39	N/A	30.00	N/A	-20.6	N/A	13.567-13.710 MHz Spurious @ 10m Dist	
* No more emissions were found up to 30MHz													
<p>Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 10000Mhz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>P.K. = Peak Q.P. = Quasi Peak Readings A.F. = Antenna factor</p>													

7.3. TX SPURIOUS EMISSION 30 TO 1000 MHz



VERTICAL PLOT



TABULATED DATA

Project :13U14847
 Company Name:HP
 Model / Config: RMN RSVLD-1301 w/ AC charger
 Mode:Tx/Rx
 Test By:Thanh Nguyen

Marker No.	Test Frequency MHz	Meter Reading dB μ V	Detector	T185 Antenna Factor dB/m	T64 preamp/cable loss dB	Corrected Reading dB(μ V/m)	FCC Pt15B Class B Qpk dB(μ V/m)	Margin dB	Height cm
Horizontal 30 - 1000MHz									
1	94.9413	42.12	PK	8.8	-27	23.92	43.52	-19.6	200
2	284.9188	49.44	PK	13.3	-26	36.74	46.02	-9.28	100
3	447.5144	43.26	PK	16.8	-25.1	34.96	46.02	-11.06	100
4	528.9333	42.64	PK	18	-24.3	36.34	46.02	-9.68	200
5	556.0729	42.85	PK	18.2	-24	37.05	46.02	-8.97	200
6	813.6573	38.8	PK	21.5	-22.8	37.5	46.02	-8.52	100
7	840.7969	37.76	PK	21.7	-22.7	36.76	46.02	-9.26	100
Vertical 30 - 1000MHz									
8	32.9078	39.25	PK	18.9	-27.7	30.45	40	-9.55	200
9	55.9281	46.14	PK	6.9	-27.4	25.64	40	-14.36	200
10	420.3747	42.13	PK	16.3	-25.2	33.23	46.02	-12.79	200

PK - Peak detector
 QP - Quasi-Peak detector

8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 7.2.2

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

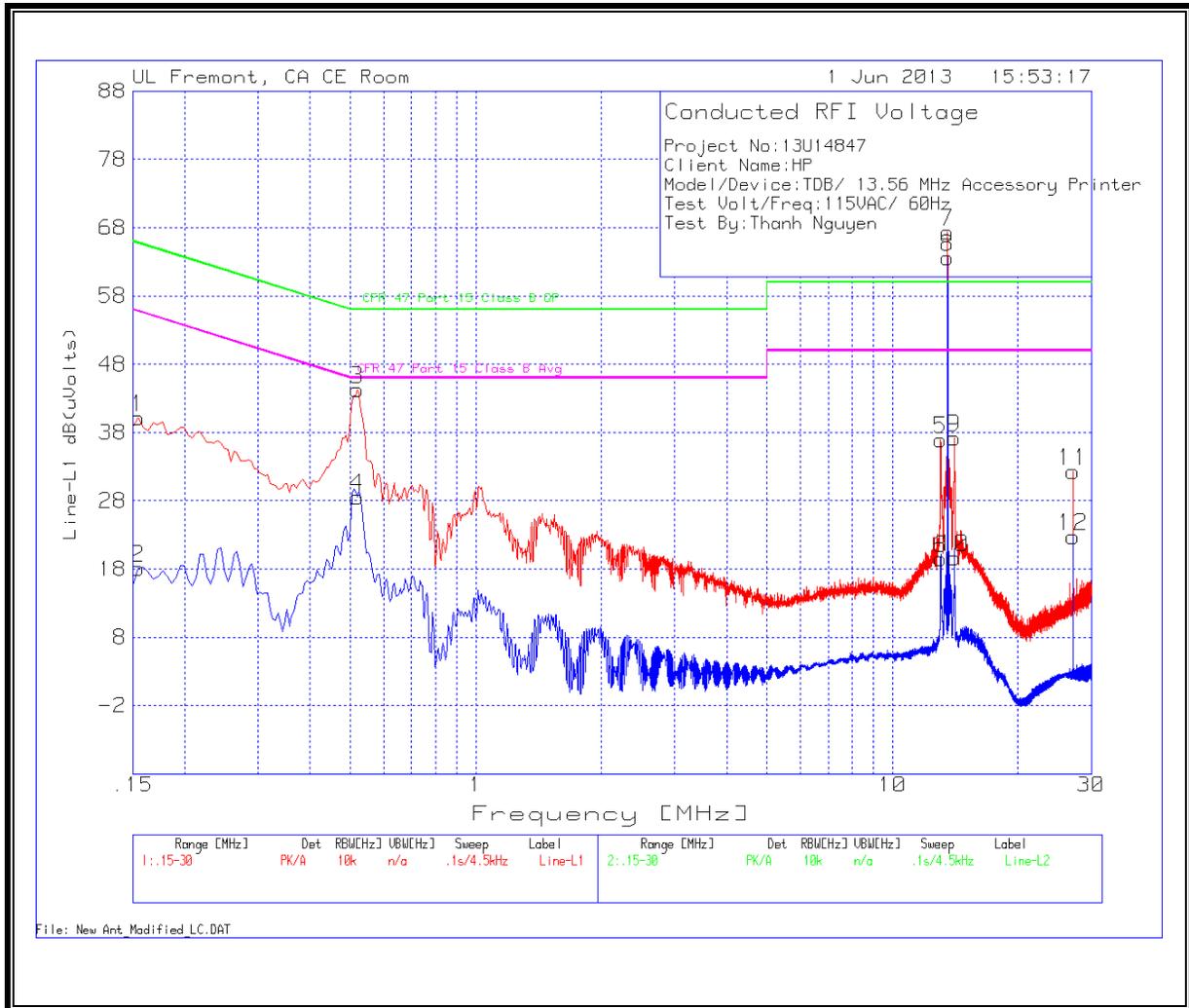
Notes:
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

TEST PROCEDURE

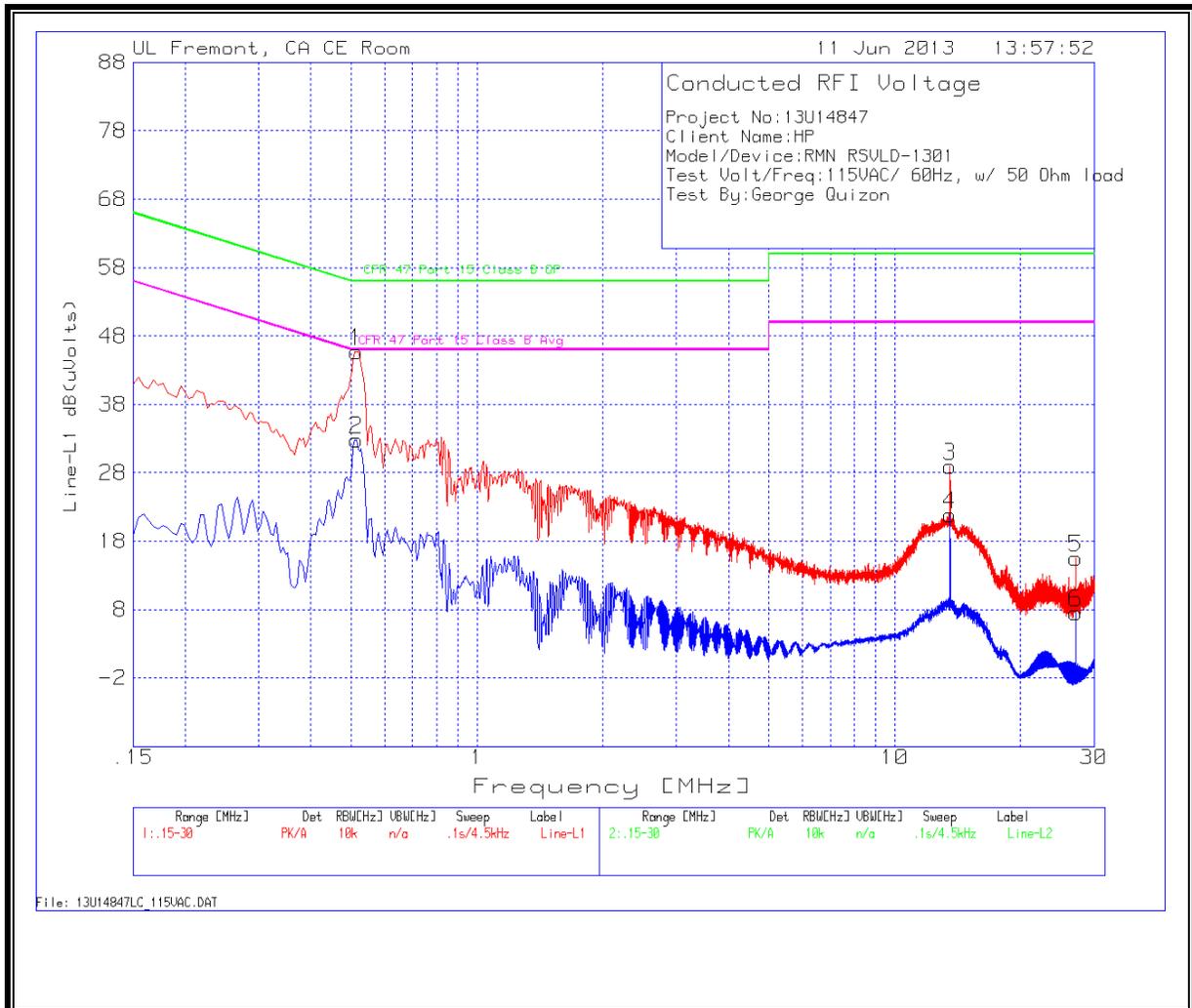
ANSI C63.4

RESULTS

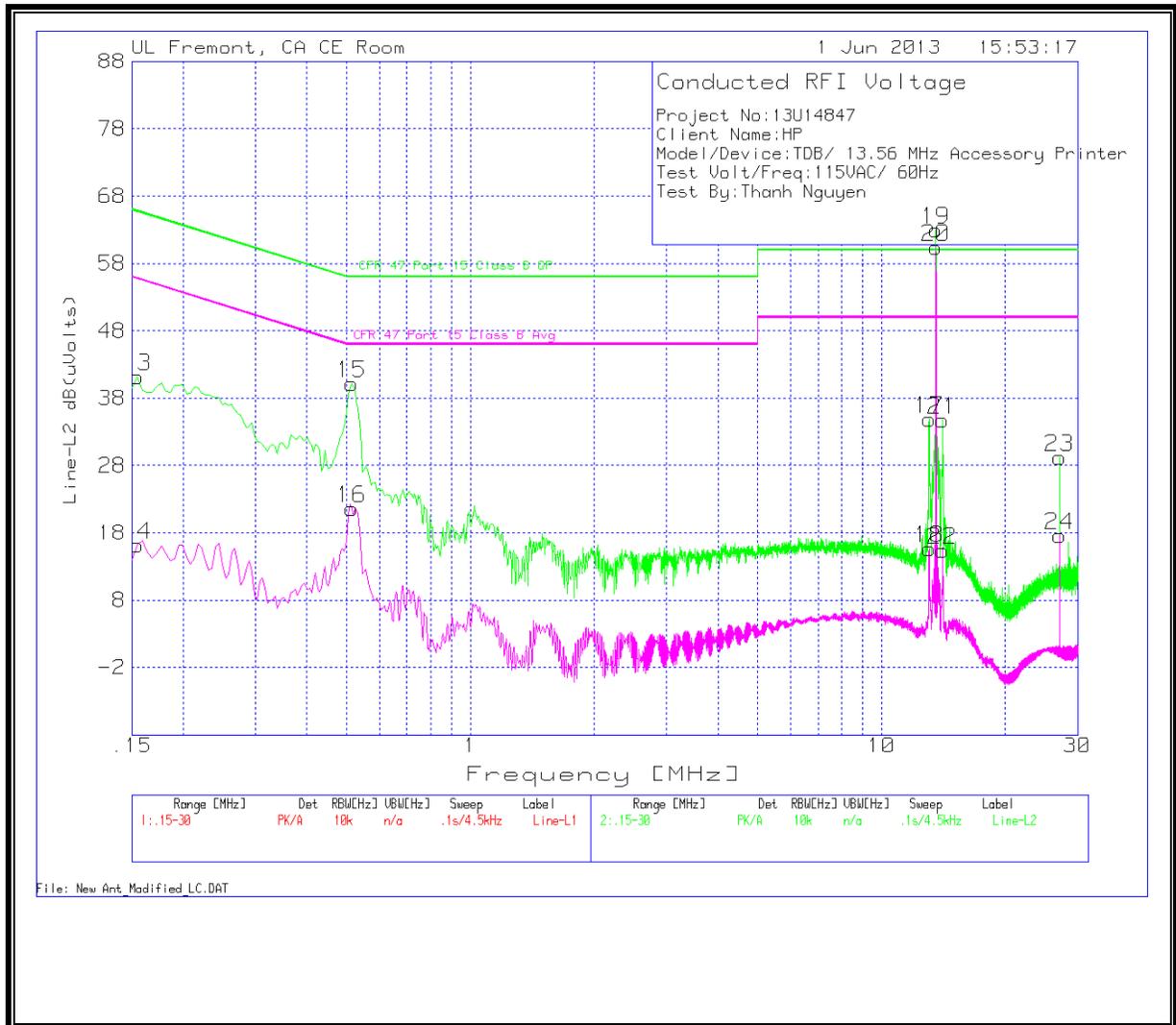
LINE 1 RESULTS W/ ANTENNA



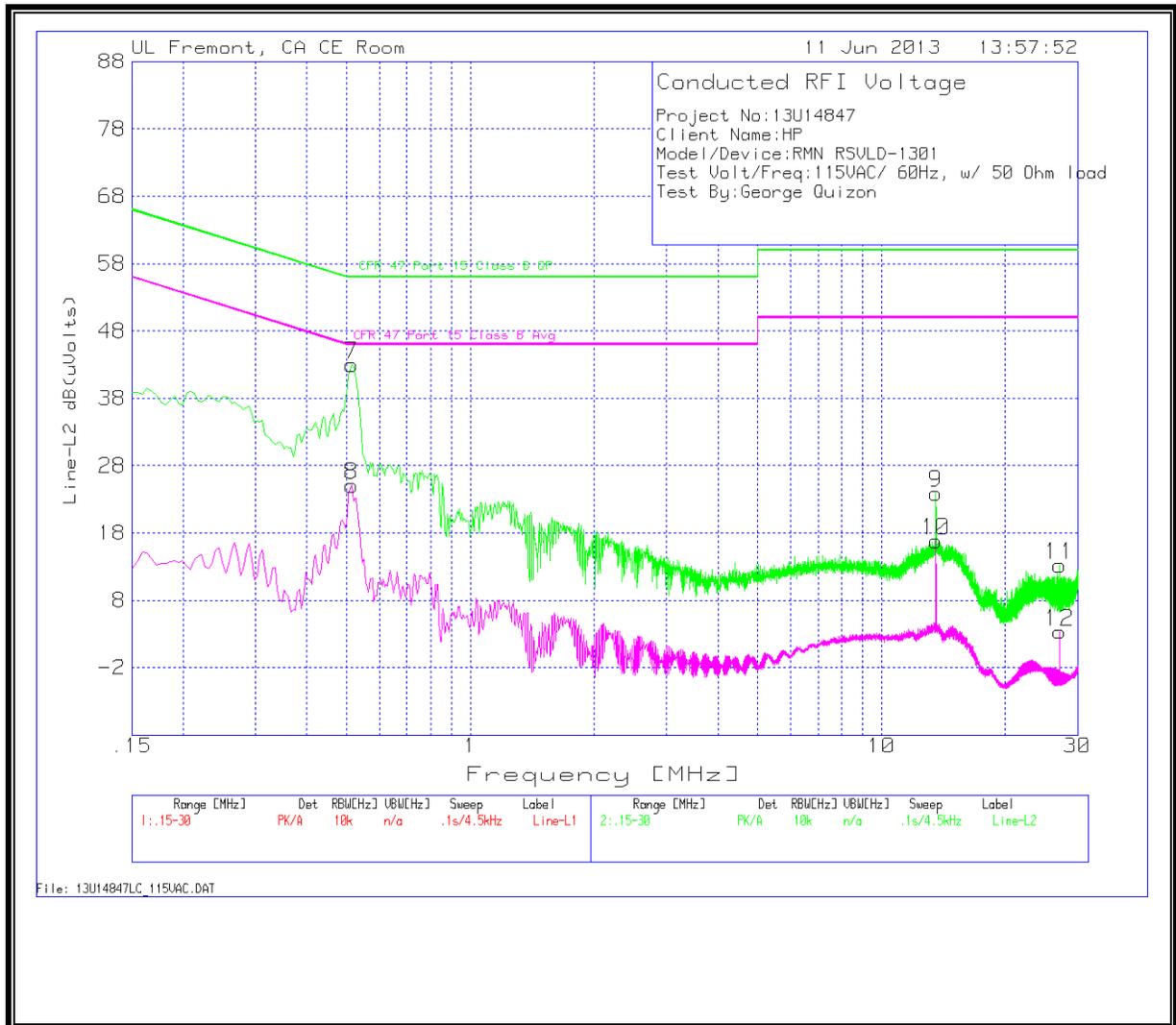
LINE 1 RESULTS W/ 50 OHM LOAD



LINE 2 RESULTS W/ ANTENNA



LINE 2 RESULTS W/ 50 OHM LOAD



6 WORST EMISSIONS W/ ANTENNA

Project No: 13U14847
 Client Name: HP
 Model/Device: RMN RSVLD-1301/ 13.56 MHz Accessory Printer
 Test Volt/Freq: 115VAC/ 60Hz w/ Antenna
 Test By: Thanh Nguyen

Test Frequency	Meter Reading	Detector	LISN dB	Path Loss dB	Corrected Reading dB(μV)	CFR 47 Part 15 Class B QP dB(μV)	QP Margin dB(μV)	CFR 47 Part 15 Class B Av dB(μV)	Av Margin dB(μV)
Line-L1 .15 - 30MHz									
0.1545	40.08	PK	0.1	0	40.18	65.8	-25.62	-	-
0.1545	18.02	Av	0.1	0	18.12	-	-	55.8	-37.68
0.519	44.22	PK	0.1	0	44.32	56	-11.68	-	-
0.519	28.46	Av	0.1	0	28.56	-	-	46	-17.44
13.0425	36.6	PK	0.2	0.2	37	60	-23	-	-
13.0425	19.14	Av	0.2	0.2	19.54	-	-	50	-30.46
*13.56	66.95	PK	0.2	0.2	67.35	60	7.35	-	-
*13.56	63.18	Av	0.2	0.2	63.58	-	-	50	13.58
14.07525	36.83	PK	0.2	0.2	37.23	60	-22.77	-	-
14.07525	19.27	Av	0.2	0.2	19.67	-	-	50	-30.33
27.1185	31.55	PK	0.5	0.3	32.35	60	-27.65	-	-
27.1185	21.97	Av	0.5	0.3	22.77	-	-	50	-27.23
Line-L2 .15 - 30MHz									
0.1545	41.05	PK	0.1	0	41.15	65.8	-24.65	-	-
0.1545	16.12	Av	0.1	0	16.22	-	-	55.8	-39.58
0.5145	40.1	PK	0.1	0	40.2	56	-15.8	-	-
0.5145	21.53	Av	0.1	0	21.63	-	-	46	-24.37
13.047	34.46	PK	0.2	0.2	34.86	60	-25.14	-	-
13.047	15.24	Av	0.2	0.2	15.64	-	-	50	-34.36
*13.56	62.56	PK	0.2	0.2	62.96	60	2.96	-	-
*13.56	59.98	Av	0.2	0.2	60.38	-	-	50	10.38
14.082	34.33	PK	0.2	0.2	34.73	60	-25.27	-	-
14.082	15.05	Av	0.2	0.2	15.45	-	-	50	-34.55
27.1185	28.46	PK	0.5	0.3	29.26	60	-30.74	-	-
27.1185	16.86	Av	0.5	0.3	17.66	-	-	50	-32.34
* Fundamental									

PK - Peak detector
 QP - Quasi-Peak detector
 Av - Average detector

6 WORST EMISSIONS W/ 50 OHM LOAD

Project No: 13U14847									
Client Name: HP									
Model/Device: RMN RSVLD-1301									
Test Volt/Freq: 115VAC/ 60Hz, w/ 50 Ohm load									
Test By: George Quizon									
Test Frequency	Meter Reading	Detector	LISN dB	Path Loss dB	Corrected Reading dB(μV)	CFR 47 Part 15 Class B QP dB(μV)	QP Margin dB(μV)	CFR 47 Part 15 Class B Av dB(μV)	Av Margin dB(μV)
Line-L1 .15 - 30MHz									
0.5145	45.61	PK	0.1	0	45.71	56	-10.29	-	-
0.5145	32.73	Av	0.1	0	32.83	-	-	46	-13.17
13.56	28.53	PK	0.2	0.2	28.93	60	-31.07	-	-
13.56	21.48	Av	0.2	0.2	21.88	-	-	50	-28.12
27.1185	14.72	PK	0.5	0.3	15.52	60	-44.48	-	-
27.1185	6.79	Av	0.5	0.3	7.59	-	-	50	-42.41
Line-L2 .15 - 30MHz									
0.5145	42.96	PK	0.1	0	43.06	56	-12.94	-	-
0.5145	24.98	Av	0.1	0	25.08	-	-	46	-20.92
13.56	23.58	PK	0.2	0.2	23.98	60	-36.02	-	-
13.56	16.46	Av	0.2	0.2	16.86	-	-	50	-33.14
27.1185	12.41	PK	0.5	0.3	13.21	60	-46.79	-	-
27.1185	2.56	Av	0.5	0.3	3.36	-	-	50	-46.64
PK - Peak detector									
QP - Quasi-Peak detector									
Av - Average detector									

9. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI C63.10: 2009

RESULTS

Reference Frequency: EUT Channel 13.560150603 MHz @ 20°C				
Limit: ± 100 ppm = 135.602 kHz				
Power Supply (VDC)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.560029855	0.089	± 100
5.00	40	13.560063495	0.064	± 100
5.00	30	13.560106611	0.032	± 100
5.00	20	13.560150603	0.000	± 100
5.00	10	13.560186997	-0.027	± 100
5.00	0	13.560207649	-0.042	± 100
5.00	-10	13.559933488	0.160	± 100
5.00	-20	13.559925800	0.166	± 100
4.75	20	13.560146270	0.003	± 100
5.25	20	13.560154361	-0.003	± 100

10. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 10 kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Frequency (MHz)	99% Bandwidth (KHz)
13.56	22.0054

99% BANDWIDTH

