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**FCC Part 15, Subpart C
Test Report**

On

**Kuvee Smart Bottle
FCC ID: 2AIDY-SBK-07**

Customer Name: Kuvee, Inc.

Customer P.O: Trans ID# 32D218963W764582D

Date of Report: May 23, 2016

Test Report No: R-6096N-1

Test Start Date: May 11, 2016

Test Finish Date: May 13, 2016

Test Technician: M. Seamans

Approved By: S. Wentworth

Report Prepared By: J. Ramsey

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Scott Wentworth
Branch Manager
NVLAP Approved Signatory



Todd Hannemann
EMC Test Engineer
iNARTE Certified Technician ATL-0255-T

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Retlif Testing Laboratories

Report No. R-6096N-1

Technical Information

Report Number: R-6096N-1

Applicant: Kuvee, Inc.

125 Kingston St., 3rd Floor

Boston, MA 02111

Manufacturer: Plexus Manufacturing Solutions

Manufacturer Address: Paseo del Norte 4640 Technology Park

45010 Zapopan, JAL, Mexico

Test Sample: Kuvee Smart Bottle

Part Number: SBK-07

Model Number: SBK-07

Serial Number: KV16050003

Brand Name: Kuvee, Inc.

Power Requirements: 120 VAC, 60 Hz

Frequency of Operation: 13.56 MHz

Antenna Type: Internal PCB Trace Antenna, No External Antenna Port

Equipment Use: RFID Tag Reader

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Section 15.225 and 15.209

Test Procedure:

ANSI C63.4:2009

Test Facility:

Retlif Testing Laboratories

101 New Boston Road

Goffstown, NH 03045

FCC Registered Test Site Number: 90899



Retlif Testing Laboratories

Report No. R-6096N-1

EUT Description/Installation:

The Kuvée Smart Bottle, or Smart Bottle, is a wine dispensing device intended for residential consumer use. It serves to provide an enhanced experience for people who enjoy wine. When the consumer inserts a Kuvée branded wine cartridge into the smart bottle, it presents the wine label on the touchscreen display. The user can navigate the user interface to discover the story of the wine, and the user can even order wine right to the bottle. The bottle uses NFC technology to read the tag on the bottle and the bottle also has Wifi to keep the list of the wines up to date. The setup of the bottle incorporates Bluetooth low energy. The bottle is charged on a charging dock, which has a USB port for charging input.

Tests Performed

The test methods performed on the Kuvée Smart Bottle are shown below:

FCC Part 15, Subpart C	Test Method
15.225(a)	Field Strength of Fundamental
15.225(b)(c)(d) and 15.209	Field Strength of Spurious, Out of Band/Band Edge Emissions
15.225(e)	Frequency Tolerance
15.207(a)	Conducted Emissions, 150 kHz to 30 MHz

Support Equipment

The following support equipment was used during testing:

Description	Manufacturer	Part Number	Model Number	Serial Number
Laptop PC	Lenovo	20ED-001HUS	11e	LR-04EB2V 15110

General Test Requirements

1. The measurement procedures of ANSI C63.4:2009 were utilized as specified in FCC Part 15, Subpart C, Section 15.31(a)(3).
2. All measurements were performed at a 3 meter test distance.
3. The EUT was rotated throughout 360 degrees for all radiated emissions measurements as specified in FCC Section 15.31(f)(5).
4. All readily accessible EUT controls were adjusted in such a manner as to maximize the level of emissions in accordance with FCC Section 15.31(g).
5. Appropriate accessories were attached to all EUT ports during the performance of radiated emissions measurements as required by FCC Section 15.31(i).



Retlif Testing Laboratories

Report No. R-6096N-1

Requirements and Test Results

Requirement:

FCC Section 15.225 (a)

Field Strength of Fundamental

FCC Section 15.225(a) – The field strength of any emission within the band 13.553 MHz – 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Field Strength Measurement & Calculation:

The following spectrum analyzer settings were used:

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f \leq 1$ GHz

VBW \geq RBW

Detector Function = Peak or Average as applicable

Trace = Max Hold

Sweep = Auto

The maximized field strength of the emission was calculated as follows:

$$F_C = M_R + C_F$$

Where:

F_C = Corrected Field Strength Reading in dB μ V/m

M_R = Uncorrected Meter Reading in dB μ V

C_F = Correction Factor in dB (Pre-Amp + Antenna Factor + Cable Loss + Distance Factor)

For frequencies below 30 MHz a distance factor of -40dB/decade was utilized



Retlif Testing Laboratories

Report No. R-6096N-1

Requirements and Test Results (con't)

15.225 (a) Field Strength of Fundamental

Radiated Emissions Measurement Procedure:

The field strength of the fundamental emission was measured with a spectrum analyzer or EMI Receiver. The EUT was placed on an 80cm high wooden test stand located 3 meters from the test antenna on a FCC listed open area test site. Emissions from the EUT were maximized by re-orientating the test sample, rotating the test sample 360 degrees, changing the orientation of the receive antenna and raising and lowering the test antenna from 1 – 4 meters. The maximized field strength of each observed emission was measured, recorded and compared to the specified limits of 15.225(a) as appropriate.

- **Results:** The maximized measured field strength of the fundamental emission was below the specified test limit of 15.225(a). See test data.

Requirement:

FCC Section 15.225 (b) - The field strength of any emission within the 13.410 – 13.553 MHz and 13.567 MHz – 13.710 MHz bands shall not exceed 334 uV/M at 30 meters.

FCC Section 15.225 (c) - The field strength of any emission within the 13.110 – 13.410 MHz and 13.710 – 14.010 MHz band shall not exceed 106 uV/M at 30 meters.

FCC Section 15.225 (d) - The field strength of any emission outside the 13.553 MHz – 13.567 MHz band shall not exceed the general radiated limits of 15.209 as shown below.

Test Limits, Field Strength of Out of Band Emissions

Fundamental Frequency (MHz)	Field Strength of Fundamental microvolts/meter	Measurement Distance
0.009 to 0.490	2400/F(kHz)	300
0.490 to 1.705	24000/F(kHz)	30
1.705 to 30.0	30	30
30.0 to 88.0	100	3
88.0 to 216.0	150	3
216.0 to 960.0	200	3
Above 960.0	500	3



Retlif Testing Laboratories

Report No. R-6096N-1

Requirements and Test Results (con't)

FCC Section 15.225 (b)(c)(d)

Radiated Emissions Measurement Procedure:

The field strength of radiated emissions were measured with a spectrum analyzer or EMI Receiver. The EUT was placed on an 80cm high wooden test stand located 3 meters from the test antenna on a FCC listed open area test site. Emissions from the EUT were maximized by re-orientating the test sample, rotating the test sample 360 degrees, changing the polarization/orientation of the test antenna and raising and lowering the test antenna from 1 – 4 meters. The maximized field strength of each observed emission was measured, recorded and compared to the specified limits of 15.225(b)(c)(d)/15.209. When necessary, the marker/delta method was used to verify bandedge compliance.

- **Results:** The maximized measured field strength of the radiated emissions were below the specified test limits of 15.225(b)(c)(d)/15.209. See test data.

Requirement:

FCC Section 15.225 (e) Frequency Tolerance

The frequency tolerance of the carrier signal must 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.

Frequency Tolerance Measurement Procedure

The EUT was placed in a temperature chamber and a frequency counter was connected to the EUT's RF output. The EUT's RF output frequency was measured and recorded over the temperature range of -20 degrees to +50 degrees C at 10 degree increments.

- **Results:** The frequency tolerance of the EUT was in compliance with the specified requirements of 15.225(e). See test data.



Retlif Testing Laboratories

Report No. R-6096N-1

Requirements and Test Results (con't)

Requirement:

FCC Section 15.207(a)

Conducted Emissions

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 shown below as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of the 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 boundary between the frequency ranges.

Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
*Decreases due to logarithm of the frequency		

Conducted Emissions Measurement Procedure

The EUT and associated cabling was placed on a 0.8 m high non-conductive test stand above the horizontal ground plane. The horizontal ground plane extended at least 0.5 m beyond the boundary of the equipment under test, and had a minimum size of 2.0 m x 2.0 m. The 0.8 m test stand was positioned such that the distance between the EUT and the vertical reference plane was 0.4 m. The LISN was located so that its closest surface was no less than 0.8 m from the nearest boundary of the equipment under test.

Each current carrying conductor of the EUT's power cord was then connected to a 50 ohm/50 μ H LISN. The LISN was mounted to the ground plane in a position that produced a minimum distance of 0.8 m between the EUT and the LISN.

The RF port of the LISN was connected to the test receiver by means of 50 Ohm coaxial cable.

- **Results:**

The conducted emissions observed from the EUT did not exceed the limits specified in 15.207(a).



Retlif Testing Laboratories

Report No. R-6096N-1

Equipment Lists

FCC Section 15.225(a) – Field Strength of Fundamental

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3207	ETS / EMCO	ANTENNA, ACTIVE LOOP	10 KHz - 30 MHz	6502	3/17/2016	3/31/2017
4029	RETLIF	OPEN AREA TEST SITE, FILING	3 / 10 Meters	RNH	5/15/2013	5/31/2016
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	11/17/2015	11/30/2016

FCC Section 15.225(d) & 15.209 – Field Strength of Spurious and Out of Band Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	6/17/2015	6/30/2016
3207	ETS / EMCO	ANTENNA, ACTIVE LOOP	10 KHz - 30 MHz	6502	3/17/2016	3/31/2017
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	3/24/2015	9/30/2016
4029	RETLIF	OPEN AREA TEST SITE, FILING	3 / 10 Meters	RNH	5/15/2013	5/31/2016
5053	ETS / EMCO	ANTENNA, BICONILOG	26 MHz - 3 GHz	3142C	2/24/2015	8/31/2016
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	11/17/2015	11/30/2016

FCC Section 15.225(e) – Frequency Tolerance

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
4997	OMEGA	THERMOMETER, DIGITAL	- 200 deg. C - +1372 deg. C HH22		9/21/2015	9/30/2016
5077	ASSOCIATED ENVIRONMENTAL	CHAMBER, TEMPERATURE	- 50 - 150 deg. C	ZFD-531	7/14/2015	7/31/2016
5133	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	10/28/2015	10/31/2016
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	11/17/2015	11/30/2016

FCC Section 15.207– Conducted Emissions, 150 kHz to 30 MHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
4027	SOLAR ELECTRONICS	LISN	50 uH, 10 kHz - 50 MHz	9252-50-R-24-BNC	2/29/2016	2/28/2017
4028	ACME	TRANSFORMER, ISOLATION		120X240	No Calibration Required	
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/29/2014	10/31/2016
5133	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 12.4 GHz	757C-10	10/28/2015	10/31/2016
5151	DELL	COMPUTER, CONTROL	N/A	OPTIPLEX 755	No Calibration Required	



Retlif Testing Laboratories

Report No. R-6096N-1

**Test Photograph(s)
Field Strength of Fundamental
FCC Part 15, Subpart C, Section 15.225(a)**



Retlif Testing Laboratories

Report No. R-6096N-1

Test Photograph(s)
Field Strength of Fundamental



Test Setup, OATS, 9 kHz to 30 MHz



Test Configuration



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Report No. R-6096N-1

**FCC Section 15.225(a) – Field Strength of Fundamental
Test Data**



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Field Strength of Fundamental	
Customer	Kuvee, Inc.	
Job Number	R-6096N-1	
Test Sample	Kuvee Smart Bottle	
Model Number	SBK-07	
Serial Number	KV16050003	
Test Specification	FCC Part 15, Subpart C	Paragraph: 15.225(a)
Operating Mode	Transmitting RFID signal at 13.56 MHz	
Technician	M. Seamans	
Date	May 11 th , 2016	

Notes: Test Distance: 3 meters Detector: Peak

TEST PARAMETERS

[illegible]

Data Sheet 1 of 1



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Report No. R-6096N-1

Test Photograph(s)
Field Strength of Spurious and Out of Band Emissions
FCC Part 15, Subpart C, Section 15.225 (b)(c)(d) and FCC 15.209



Retlif Testing Laboratories

Report No. R-6096N-1

Test Photograph(s)
Field Strength of Spurious and Out of Band Emissions



Test Setup



Test Setup, OATS, 9 kHz to 30 MHz



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Report No. R-6096N-1

Test Photograph(s)
Field Strength of Spurious and Out of Band Emissions



Test Setup, OATS, 30 MHz to 1 GHz, Horizontal Antenna Polarization



Test Setup, OATS, 30 MHz to 1 GHz, Vertical Antenna Polarization



Retlif Testing Laboratories

Report No. R-6096N-1

Test Photograph(s)
Field Strength of Spurious and Out of Band Emissions



Test Setup, OATS, 1 to 5 GHz, Horizontal Antenna Polarization



Test Setup, OATS, 1 to 5 GHz, Vertical Antenna Polarization



Retlif Testing Laboratories

Report No. R-6096N-1

**FCC Part 15, Subpart C, Section 15.225 (b)(c)(d) and FCC 15.209 –
Field Strength of Spurious and Out of Band Emissions**

Test Data



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Field Strength of Out of Band Emissions	
Customer	Kuvee, Inc.	
Job Number	R-6096N-1	
Test Sample	Kuvee Smart Bottle	
Model Number	SBK-07	
Serial Number	KV16050003	
Test Specification	FCC Part 15, Subpart C	Paragraph: 15.209
Operating Mode	Continuously transmitting signal at 13.56MHz	
Technician	M. Seamans	
Date	May 11 th , 2016	

Notes: Antenna Test Distance: 3 meters

TEST PARAMETERS

[illegible]

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 1 of 3



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Field Strength of Out of Band Emissions	
Customer	Kuvee, Inc.	
Job Number	R-6096N-1	
Test Sample	Kuvee Smart Bottle	
Model Number	SBK-07	
Serial Number	KV16050003	
Test Specification	FCC Part 15, Subpart C	Paragraph: 15.209
Operating Mode	Continuously transmitting signal at 13.56MHz	
Technician	M. Seamans	
Date	May 11 th , 2016	

Notes: Antenna Test Distance: 3 meters

TEST PARAMETERS

[illegible]

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 2 of 3



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Field Strength of Out of Band Emissions	
Customer	Kuvee, Inc.	
Job Number	R-6096N-1	
Test Sample	Kuvee Smart Bottle	
Model Number	SBK-07	
Serial Number	KV16050003	
Test Specification	FCC Part 15, Subpart C	Paragraph: 15.209
Operating Mode	Continuously transmitting signal at 13.56MHz	
Technician	M. Seamans	
Date	May 11 th , 2016	

Notes: Antenna Test Distance: 3 meters

TEST PARAMETERS

Frequency	Antenna Position	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading		Converted Reading	Limit at 3M
MHz	(H/V) / Height	Degrees	dBuV	dB	dBuV/m		uV/m	uV/m
30.00	-	-	-	-	-		-	100.00
	-	-	-	-	-		-	I
88.00	-	-	-	-	-		-	100.00
88.00	-	-	-	-	-		-	150.00
	-	-	-	-	-		-	
216.00	-	-	-	-	-		-	200.00
216.00	-	-	-	-	-		-	200.00
	-	-	-	-	-		-	
253.50	V-1.5m	0.0	23.58	16.33	39.91		98.97	
282.50	V-1.5m	0.0	27.44	17.13	44.57		169.24	
315.50	V-1.5m	0.0	26.21	17.99	44.20		162.18	
348.50	V-1.5m	0.0	20.83	20.15	40.98		111.94	
382.00	V-1.5m	0.0	12.42	21.29	33.71		48.47	
	-	-	-	-	-		-	
960.00	-	-	-	-	-		-	200.00
960.00	-	-	-	-	-		-	500.00
	-	-	-	-	-		-	
5000.00	-	-	-	-	-		-	500.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

Data Sheet 3 of 3



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

EMISSIONS TEST DATA SHEET		
Test Method	Band Edge	
Customer	Kuvee, Inc.	
Job Number	R-6096N-1	
Test Sample	Kuvee Smart Bottle	
Model Number	SBK-07	
Serial Number	KV16050003	
Test Specification	FCC Part 15, Subpart C	Paragraph: 15.209
Operating Mode	Continuously transmitting signal at 13.56MHz	
Technician	M. Seamans	
Date	May 11 th , 2016	

Notes: Antenna Test Distance: 3 meters Band: 13.110-14.010 MHz

TEST PARAMETERS

[illegible]

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum. * This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

Data Sheet 1 of 1



Retlif Testing Laboratories

Report No. R-6096N-1

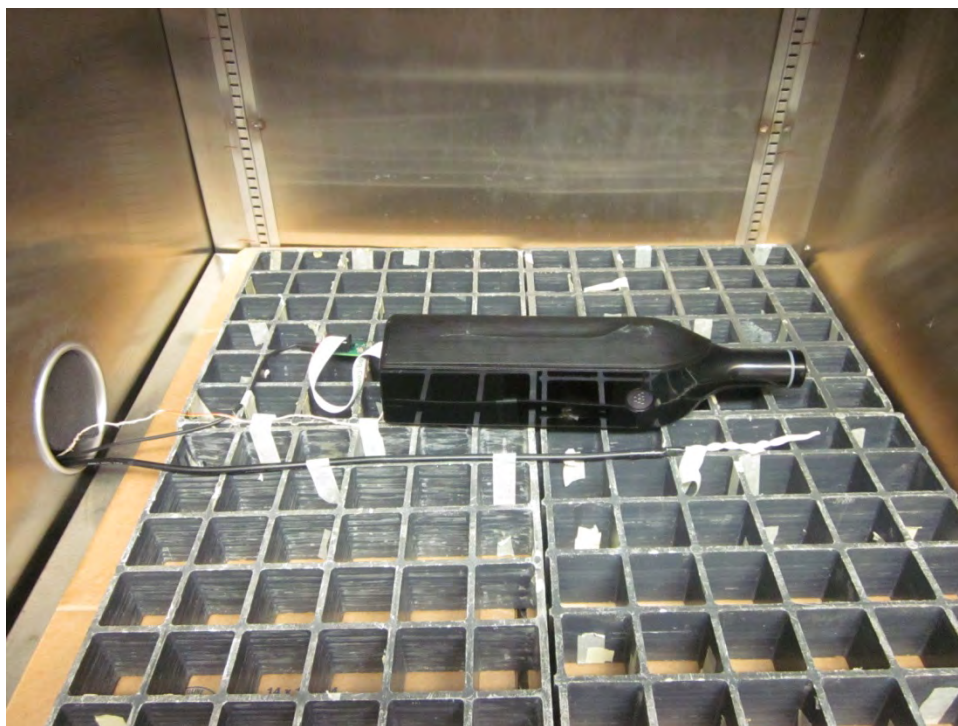
**Test Photograph(s)
Frequency Tolerance
FCC Part 15, Subpart C, Section 15.225(e)**



Retlif Testing Laboratories

Report No. R-6096N-1

Test Photograph(s)
Frequency Tolerance



Test Setup 1



Test Setup 2



Retlif Testing Laboratories

Report No. R-6096N-1

**FCC Section 15.255(e) – Frequency Tolerance
Test Data**



Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Frequency Tolerance
Customer	Kuvee, Inc.
Job Number	R-6096N-1
Test Sample	Kuvee Smart Bottle
Model Number	SBK-07
Serial Number	KV16050003
Test Specification	FCC Part 15.225(e)
Operating Mode	Continuously transmitting signal at 13.56MHz
Technician	M. Seamans
Date	May 10 th , 2016

Notes: EUT was powered off during temperature soak, then powered on for five minutes transmitting

TEST PARAMETERS

[illegible]

Data Sheet 1 of 1



Retlif Testing Laboratories

Report No. R-6096N-1

**Test Photograph(s)
Conducted Emissions, 150 kHz to 30 MHz
FCC Section 15.207(a)**



Retlif Testing Laboratories

Report No. R-6096N-1

Test Photograph(s)
Conducted Emissions, 150 kHz to 30 MHz



Test Configuration



Test Setup



Retlif Testing Laboratories

Report No. R-6096N-1

**FCC Section 15.207(a) – Conducted Emissions, 150 kHz to 30 MHz
Test Data**

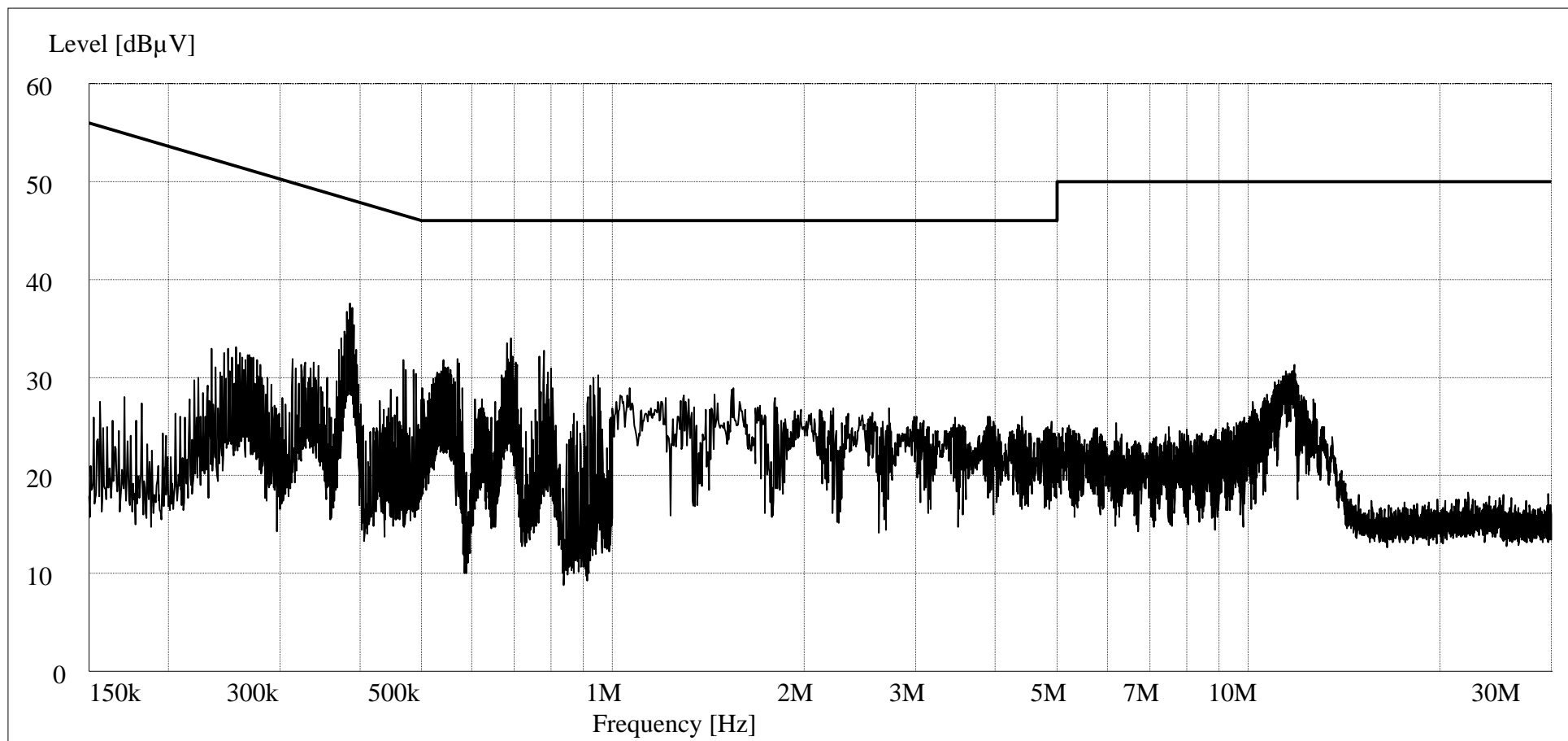


Retlif Testing Laboratories

Report No. R-6096N-1

RETLIF TESTING LABORATORIES

Test Method	Conducted Emissions 150 kHz to 30 MHz		
Customer	Kuvee, Inc.	Job No.	R-6096N-1
Test Sample	Kuvee Smart Bottle		
Model No.	SBK-07	Serial No.	KV16050003
Operating Mode	Charging		
Test Specification	FCC Part 15. 207(a)		
Technician	M. Seamans	Date	May 13 th , 2016
Climatic Conditions	Temp: 19.5 °C Relative Humidity: 30.0 %		
Lead Tested	120 VAC 60 Hz Hot Peak Readings to Average Limits.		



RETLIF TESTING LABORATORIES

Test Method	Conducted Emissions 150 kHz to 30 MHz		
Customer	Kuvee, Inc.	Job No.	R-6096N-1
Test Sample	Kuvee Smart Bottle		
Model No.	SBK-07	Serial No.	KV16050003
Operating Mode	Charging		
Test Specification	FCC Part 15. 207(a)		
Technician	M. Seamans	Date	May 13 th , 2016
Climatic Conditions	Temp: 19.5 °C Relative Humidity: 30.0 %		
Lead Tested	120 VAC 60 Hz Neutral Peak Readings to Average Limits.		

