



**FCC 47 CFR PART 15 SUBPART C
ISED CANADA RSS-210 ISSUE 9**

CERTIFICATION TEST REPORT

FOR

CELL ANALYZER

MODEL NUMBER: VI-CELL BLU and VI-CELL FL

**FCC ID: 2AOSQRFIDM2
IC: 23864-RFIDM2**

REPORT NUMBER: R11981152-E1

ISSUE DATE: 2018-05-24

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Revision History

Ver.	Issue Date	Revisions	Revised By
1	2018-05-24	Initial Issue	Brian T. Kiewra
2	2018-05-31	Revised address	Brian T. Kiewra
3	2018-06-14	Revised OBW and 20dB bandwidth	Niklas Haydon

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Beckman Coulter, Inc.
250 S. Kraemer Blvd
Brea, CA 92821, USA

EUT DESCRIPTION: Cell Analyzer

MODEL: Vi-Cell BLU/Vi-Cell FL

SERIAL NUMBER: MP1-05

DATE TESTED: 2018-04-23 to 2018-05-03

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Compliant
ISED CANADA RSS-210 Issue 9	Compliant
ISED CANADA RSS-GEN Issue 4	Compliant

UL LLC 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 LLC 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.

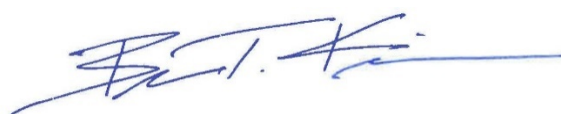
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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, or any agency of the U.S. Government.

Approved & Released
For UL LLC By:



Jeffrey Moser
Operations Leader
UL – Consumer Technology Division

Prepared By:



Brian T. Kiewra
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-210 Issue 9.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA.

12 Laboratory Dr., RTP, NC 27709
☐ Chamber A
☐ Chamber C

2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560
☒ Chamber NORTH
☐ Chamber SOUTH

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>.

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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY	Required by standard
Occupied Channel Bandwidth	2.00%	±5 %
RF output power, conducted	1.3 dB	±1,5 dB
Power Spectral Density, conducted	2.47 dB	±3 dB
Unwanted Emissions, conducted	2.94 dB	±3 dB
All emissions, radiated	5.36 dB	±6 dB
Temperature	2.26 °C	±3 °C
Supply voltages	2.40%	±3 %
Time	3.39%	±5 %

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a laboratory test equipment used to analyze various plant, insect and mammalian cells for creating viable cell cultures. This Reagent box has an imbedded RFID chip that is interrogated by the RFID Board to determine if it is the correct reagent pack for the test being performed and monitors and reports the reagent levels.

5.2. MANUFACTURER'S DESCRIPTION OF MODEL DIFFERENCES

The Vi-Cell FL is electrically identical to the Vi-Cell BLU but the LED optical board is populated with additional LEDs; red, green, blue and UV. These LEDs are used to fluoresce the special dyes so that the cells can be illuminated for counting and imaging. Radio testing was performed on the Vi-Cell BLU model.

5.3. MAXIMUM ELECTRIC FIELD STRENGTH

The testing was performed at 3 meter. The PK transmitter maximum E-field reading at 30m is 25.85dBuV/m corrected from the 3m reading of 65.87dBuV/m.

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral loop coil antenna with an area of 0.0056m².

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was C08365, Rev. AA
The EUT software installed during testing was C08365, Rev. AA
The test utility software used during testing was SHutility.exe, rev. 1.0

5.6. WORST-CASE CONFIGURATION AND MODE

The EUT is intended to be installed in only one orientation therefore all radiated testing was performed in its intended orientation (X-Axis).

5.7. MODIFICATIONS

No modifications were made during testing.

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	XP Power	AHE220PS12	NA	NA
ENET Switch	TP-Link	TL-SG105	NA	NA

I/O CABLES

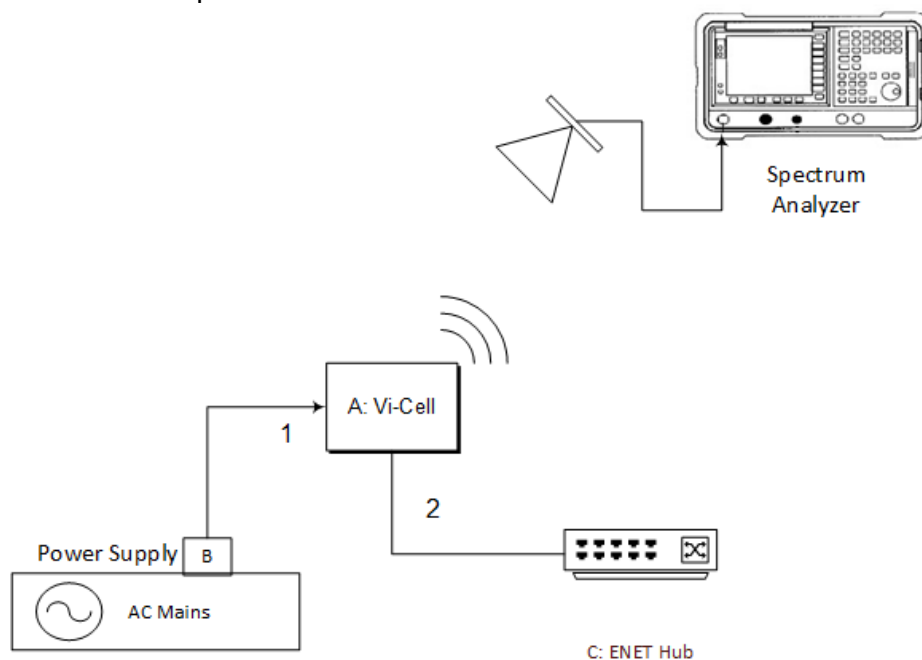
I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Mains	1	4-Pin DIN	Mains	>1m	NA
2	ENET	1	RJ45	ENET	>1m	Connected to switch

TEST SETUP

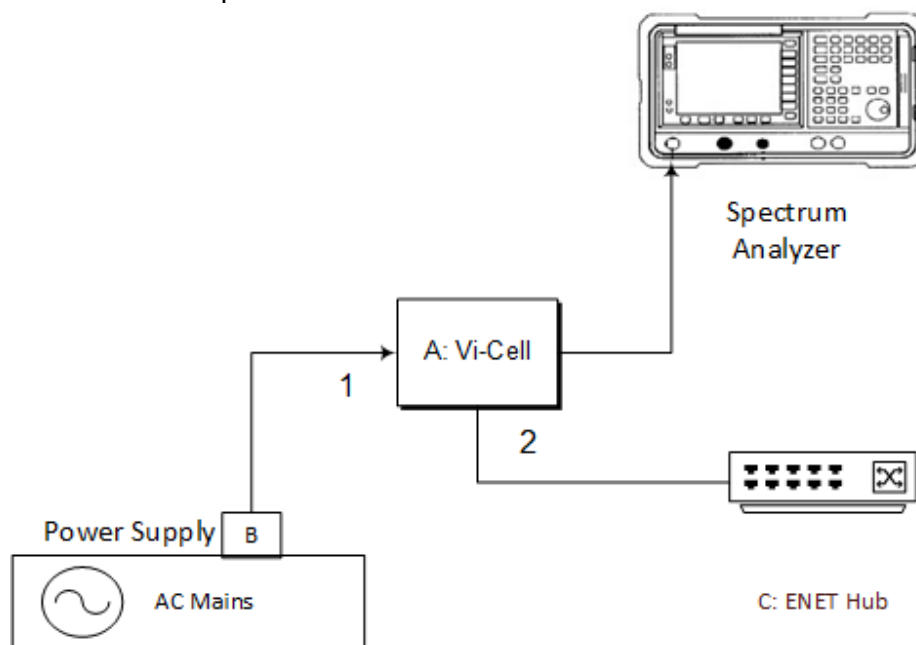
The EUT is installed as a standalone device.

SETUP DIAGRAM FOR TESTS

Radiated Setup:



Conducted Setup:



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used – Frequency Stability Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
Conducted Room 2					
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2017-11-06	2018-11-06
1100502	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2017-06-06	2018-06-06
139843	Temp/Humid/Pressure Meter	Control Co./Fisher	14-650-118	2016-12-23	2018-12-23
MM0167	Multi-meter	Agilent	U1232A	2017-10-21	2018-10-30
76021	DC Power Source	CircuitSpecialist.com	CSI3005X5	NA	NA

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz (Loop Ant.)					
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2018-01-02	2019-01-02
30-1000 MHz					
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2017-07-18	2018-07-31
Gain-Loss Chains					
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2017-09-15	2018-09-15
N-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2017-06-11	2018-06-11
Receiver & Software					
SA0027	Spectrum Analyzer	Agilent	N9030A	2018-04-04	2019-04-04
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
s/n 161024690	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL076	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2017-06-12	2018-06-12
s/n 160938893	Environmental Meter	Fisher Scientific	14-650-118	2016-11-02	2018-11-02
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2017-08-22	2018-08-22
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2017-08-23	2018-08-23
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2017-06-12	2018-06-12
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

7. OCCUPIED BANDWIDTH

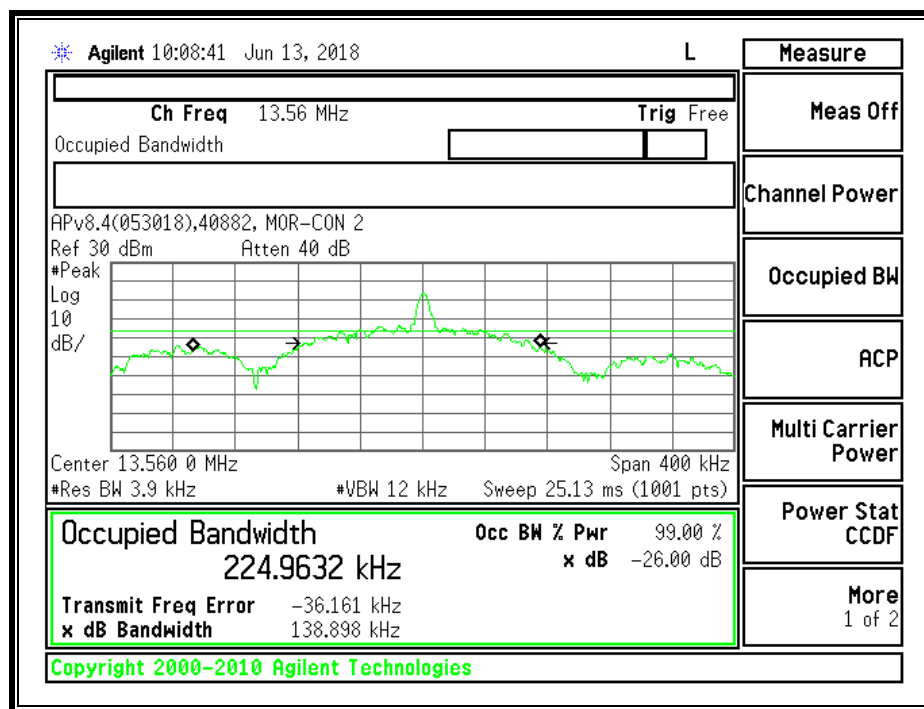
LIMITS

None; for reporting purposes only.

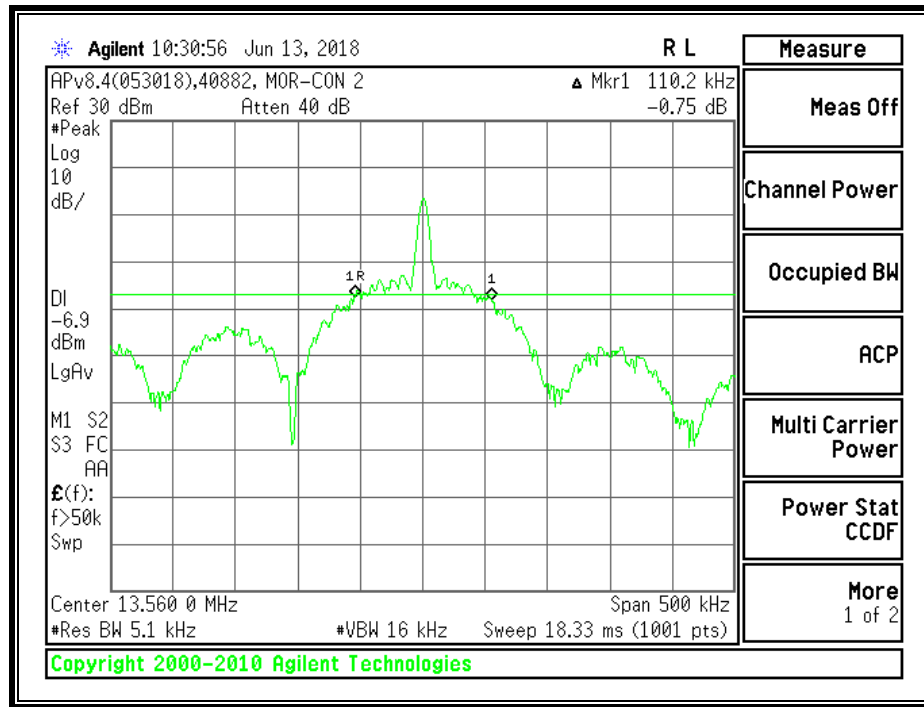
FCC §15.215 (c) and RSS-GEN, ANSI C63.10 Sections 6.9.2 and 6.9.3 were used for the measurement procedure.

Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
13.56	0.110	0.225

99% BANDWIDTH PLOT



20dB BANDWIDTH PLOT



TEST INFORMATION

Date: 2018-06-13
Tested By: 40882

8. RADIATED EMISSION TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMIT

§15.209

§15.225

IC RSS-210, Annex B.6 (Transmitter)

IC RSS-GEN, Section 7.1.2 (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 field strength from uV/m to dBuV/m is:

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

In addition:

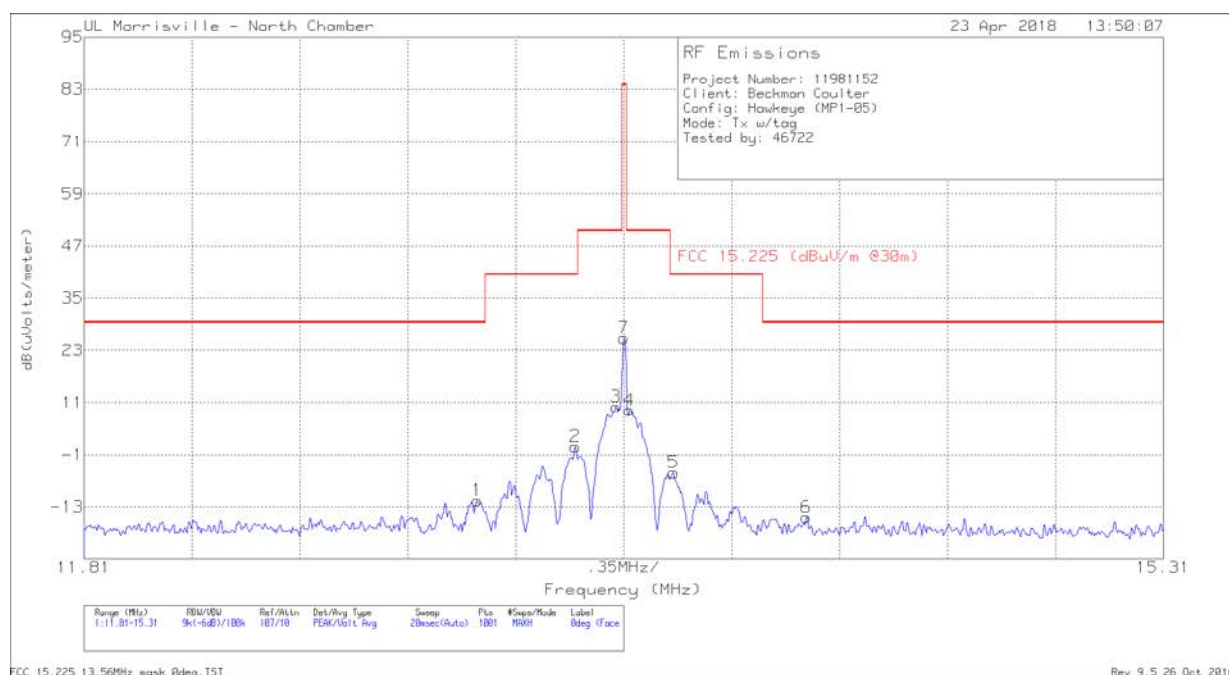
§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§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.

8.2.FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15-30MHz)

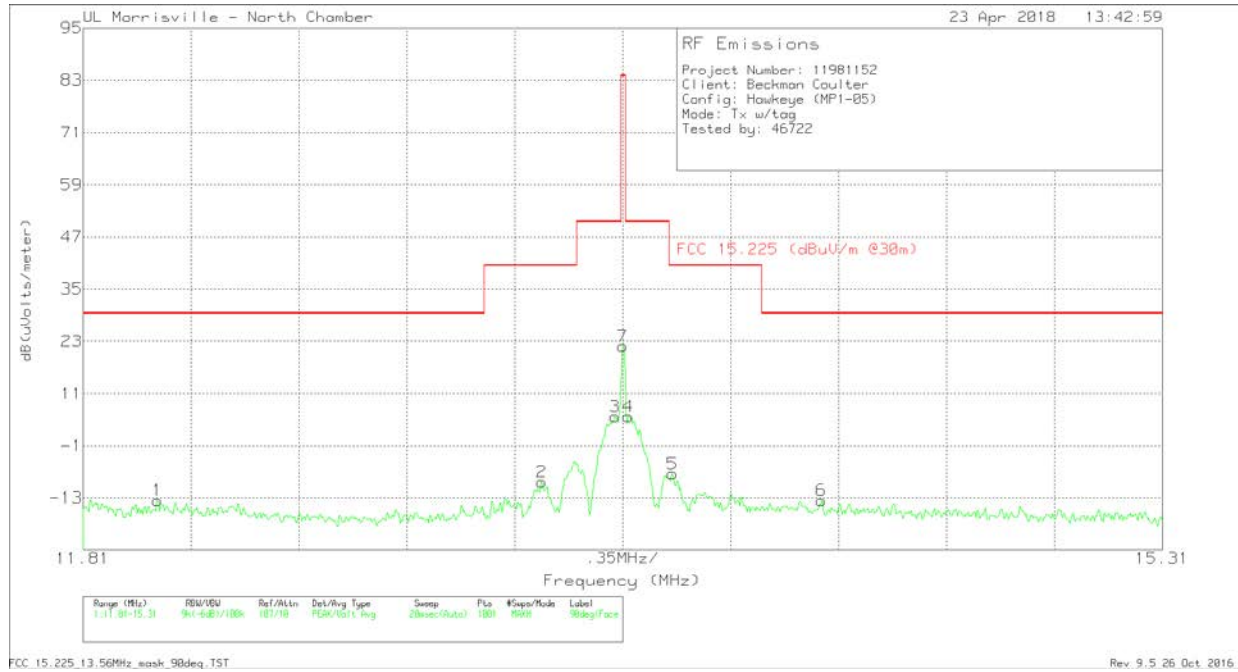
Note: All measurements were made at a test distance of 3 m. The spurious emissions limits in the plots and tabular data are the FCC/IC limits extrapolated from the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to the measurement distance to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log(\text{specification distance} / \text{test distance})$. In the case of the fundamental measurement, the data was corrected as described above instead of the limit.

Although these tests were performed at a test site other than an open area test site, adequate comparison measurements were confirmed against an open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.



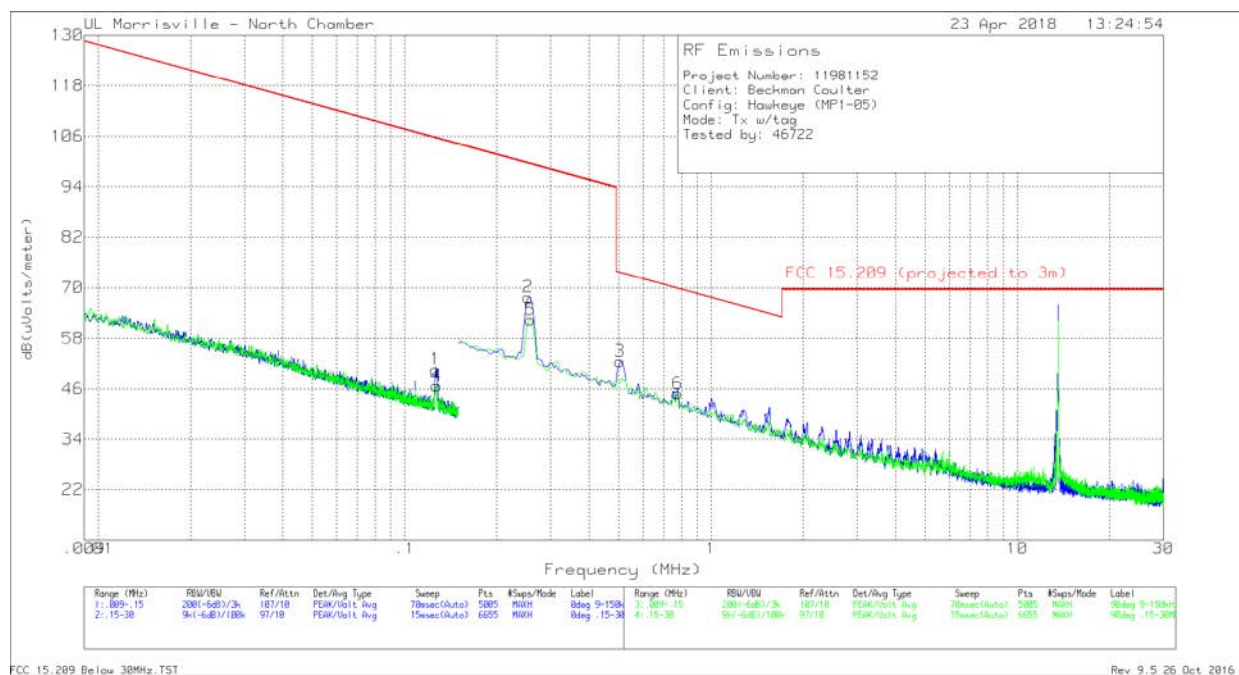
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	13.084	17.38	Pk	10.5	.6	-40	-11.52	29.5	-41.02	177
2	13.4025	29.79	Pk	10.5	.6	-40	.89	40.5	-39.61	177
3	13.5355	38.98	Pk	10.5	.6	-40	10.08	50.5	-40.42	177
7	13.56	54.77	Pk	10.5	.6	-40	25.87	84	-58.13	177
4	13.5775	38.19	Pk	10.5	.6	-40	9.29	50.5	-41.21	177
5	13.721	23.94	Pk	10.4	.6	-40	-5.06	40.5	-45.56	177
6	14.1515	13.67	Pk	10.4	.6	-40	-15.33	29.5	-44.83	177

Pk - Peak detector



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.225 (dBuV/m @30m)	Margin (dB)	Azimuth (Degs)
1	12.0515	15.21	Pk	10.6	.6	-40	-13.59	29.5	-43.09	284
2	13.2975	19.49	Pk	10.5	.6	-40	-9.41	40.5	-49.91	284
3	13.5355	34.52	Pk	10.5	.6	-40	5.62	50.5	-44.88	284
7	13.56	50.77	Pk	10.5	.6	-40	21.87	84	-62.13	284
4	13.5775	34.51	Pk	10.5	.6	-40	5.61	50.5	-44.89	284
5	13.721	21.49	Pk	10.4	.6	-40	-7.51	40.5	-48.01	284
6	14.204	15.39	Pk	10.4	.6	-40	-13.61	29.5	-43.11	284

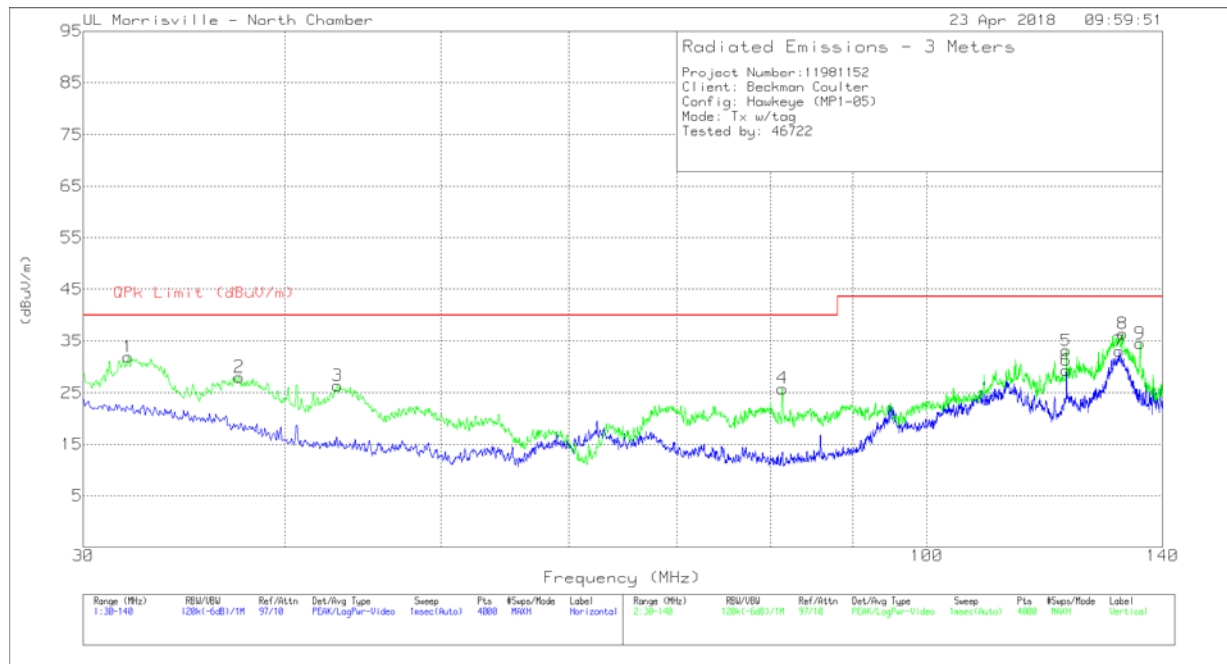
Pk - Peak detector



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Corrected Reading dB(uV/m)	FCC 15.209 QP (projected to 3m)	QP Margin (dB)	FCC 15.209 AV (projected to 3m)	AV Margin (dB)	FCC 15.209 PK (projected to 3m)	PK Margin (dB)	Azimuth (Degs)
1	.12635	38.95	Pk	11.5	.1	50.55	-	-	105.57	-55.02	125.57	-75.02	0-360
4	.12708	35.13	Pk	11.5	.1	46.73	-	-	105.52	-58.79	125.52	-78.79	0-360
2	.25318	56.14	Pk	11.5	.1	67.74	-	-	99.54	-31.8	119.54	-51.8	0-360
5	.25766	50.79	Pk	11.5	.1	62.39	-	-	99.38	-36.99	119.38	-56.99	0-360
3	.50439	40.88	Pk	11.5	.1	52.48	73.55	-21.07	-	-	-	-	0-360
6	.77804	33.32	Pk	11.5	.1	44.92	69.78	-24.86	-	-	-	-	0-360

Pk - Peak detector

8.3. TX SPURIOUS EMISSIONS (30 - 140MHz)



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.9805	38.2	Pk	25.4	-31.7	31.9	40	-8.1	0-360	102	V
2	37.4819	38.6	Pk	21.1	-31.7	28	40	-12	0-360	102	V
3	43.1208	41.07	Pk	16.9	-31.6	26.37	40	-13.63	0-360	102	V
4	81.3831	44.31	Pk	12.6	-31.1	25.81	40	-14.19	0-360	102	V
6	122.0384	40.94	Pk	19.1	-30.7	29.34	43.52	-14.18	0-360	199	H
5	122.0384	44.71	Pk	19.1	-30.7	33.11	43.52	-10.41	0-360	102	V
7	131.6659	44.79	Pk	18.9	-30.7	32.99	43.52	-10.53	0-360	298	H
8	132.2985	48.21	Pk	18.9	-30.7	36.41	43.52	-7.11	0-360	102	V
9	135.5994	46.43	Pk	18.7	-30.6	34.53	43.52	-8.99	0-360	102	V

Pk - Peak detector

9. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207

IC RSS-GEN, Section 8.8

(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	Limits (dB μ V)	
(MHz)	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.		

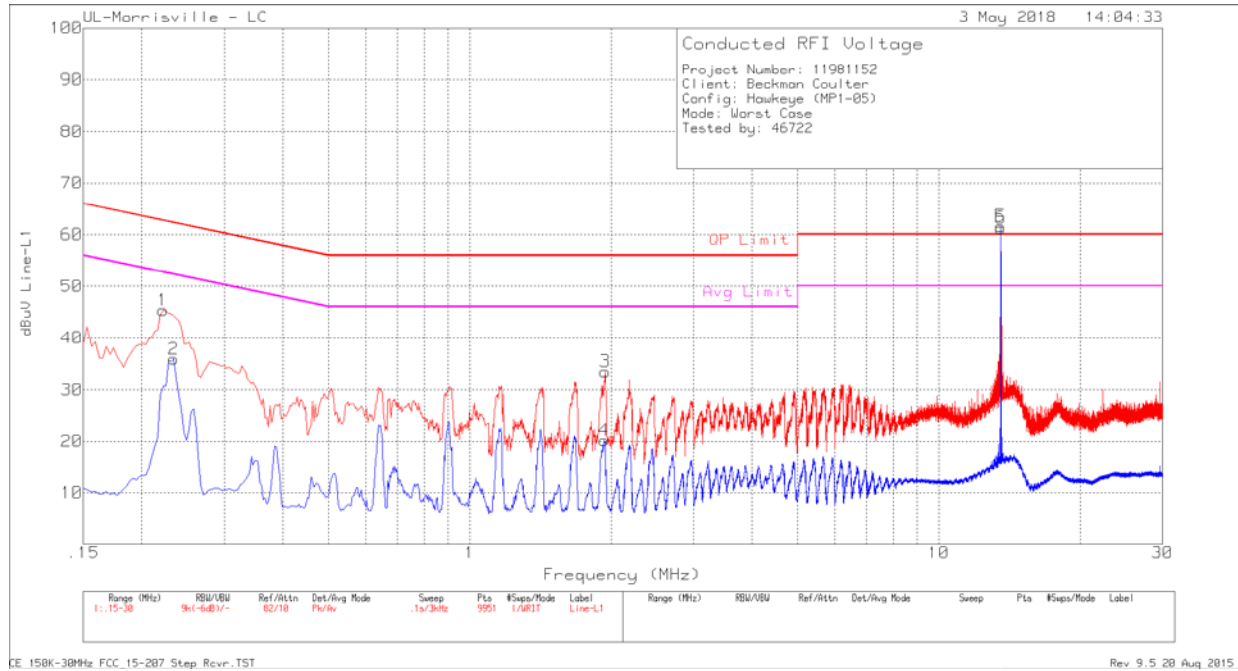
TEST PROCEDURE

ANSI C63.10 and FCC KDB 174176 D01, Line Conducted FAQ v01r01.

RESULTS

No non-compliance noted:

LINE 1 RESULTS - UNTERMINATED



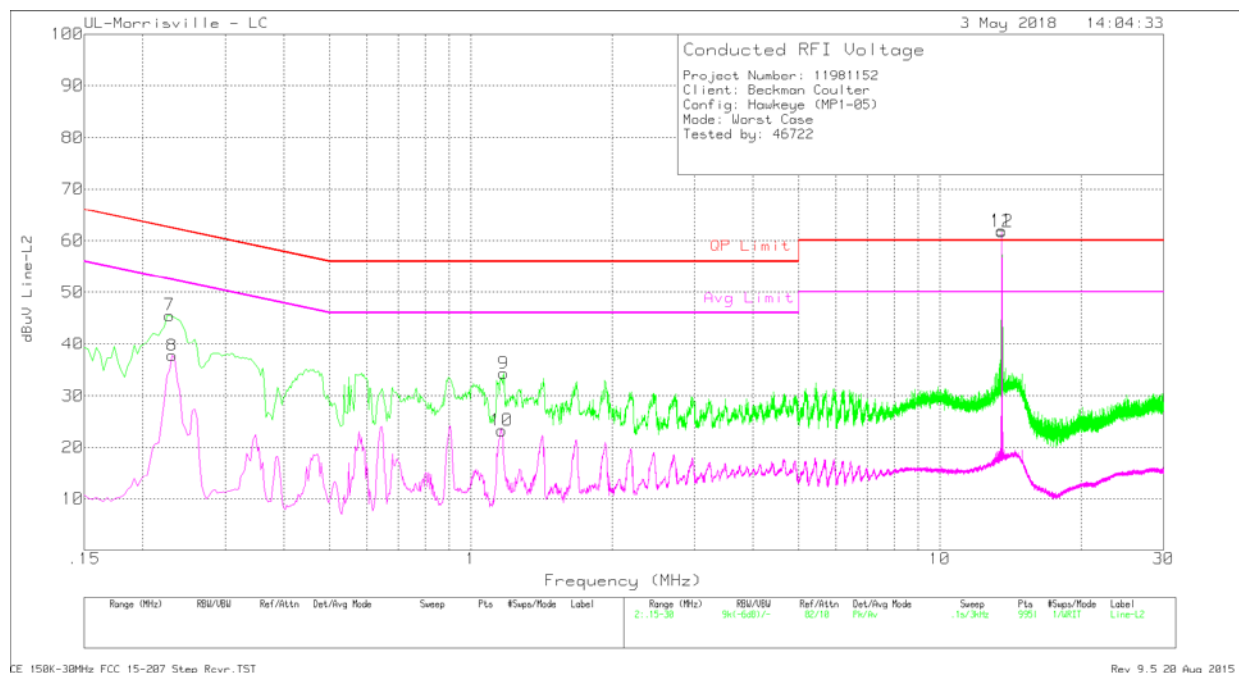
Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
1	.222	35.34	Pk	.1	9.9	45.34	62.74	-17.4	-	-
2	.234	25.9	Av	.1	9.9	35.9	-	-	52.31	-16.41
3	1.944	23.5	Pk	0	10	33.5	56	-22.5	-	-
4	1.935	10.17	Av	0	10	20.17	-	-	46	-25.83
5	13.56 ¹	51.44	Pk	.1	10.1	61.64	-	-	-	-
6	13.56 ¹	51.08	Av	.1	10.1	61.28	-	-	-	-

Note 1: Fundamental

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS – UNTERMINATED



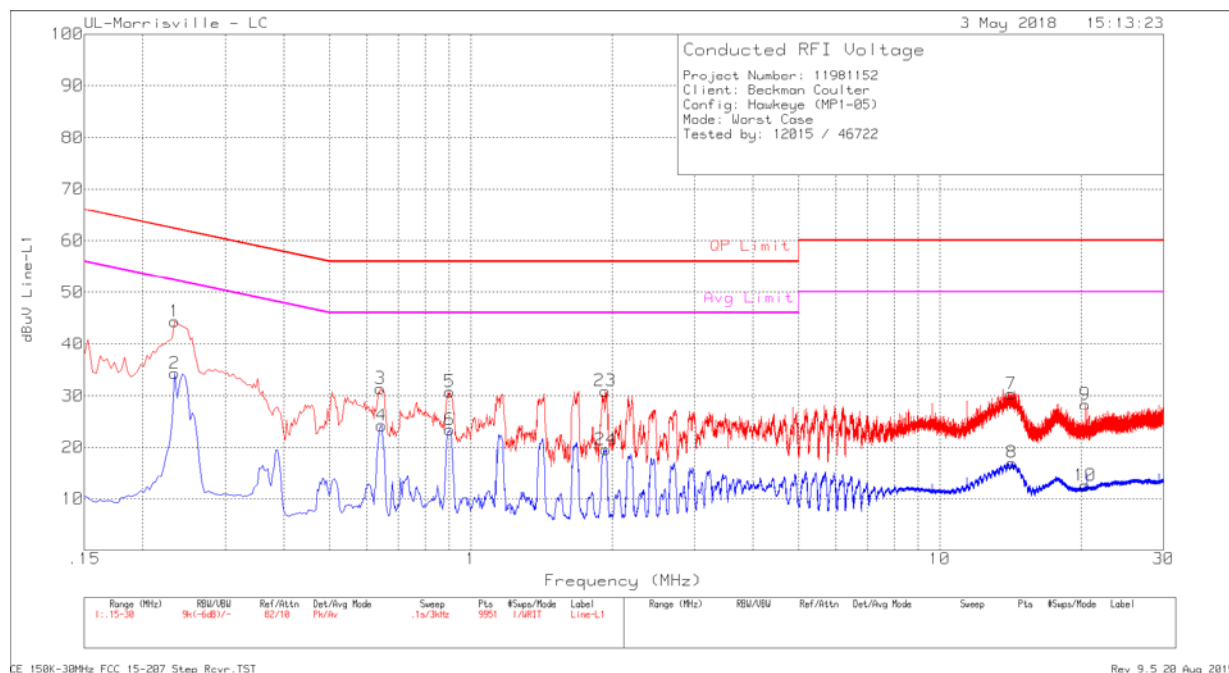
Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
7	.228	35.56	Pk	.1	9.9	45.56	62.52	-16.96	-	-
8	.231	27.72	Av	.1	9.9	37.72	-	-	52.41	-14.69
9	1.176	24.41	Pk	0	9.9	34.31	56	-21.69	-	-
10	1.164	13.31	Av	0	9.9	23.21	-	-	46	-22.79
11	13.56 ¹	51.78	Pk	.1	10.1	61.98	-	-	-	-
12	13.56 ¹	51.56	Av	.1	10.1	61.76	-	-	-	-

Note 1: Fundamental

Pk - Peak detector

Av - Average detection

LINE 1 RESULTS - TERMINATED

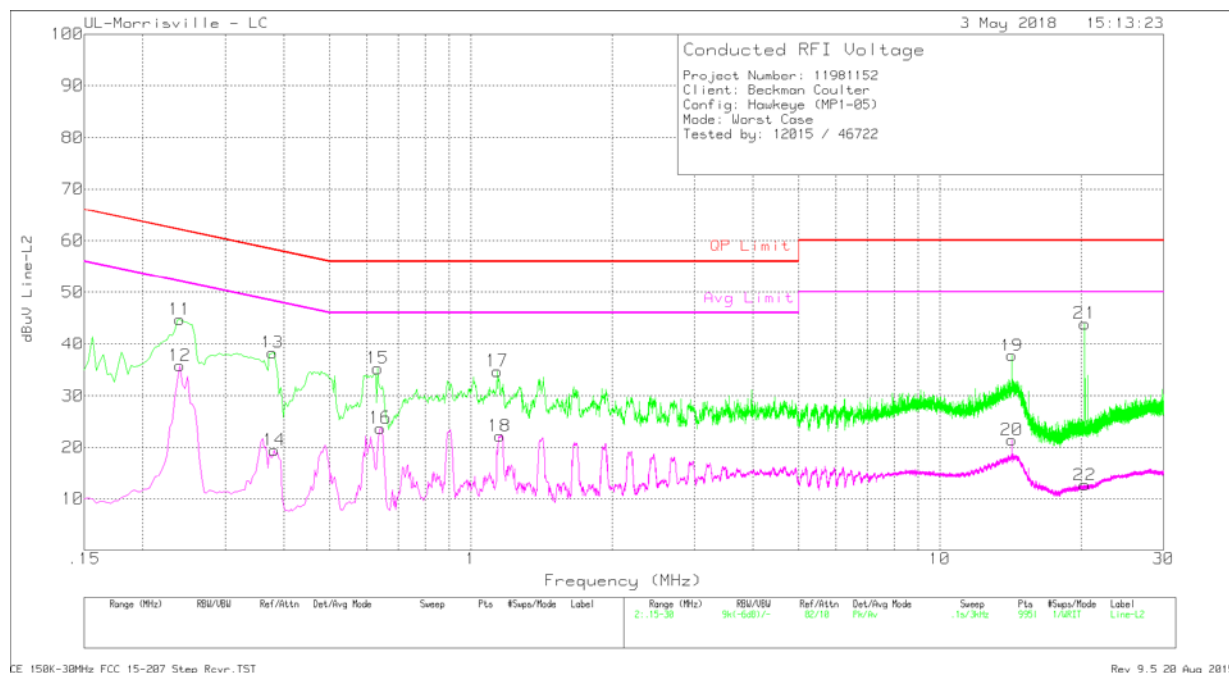


Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
1	.234	34.38	Pk	.1	9.9	44.38	62.31	-17.93	-	-
2	.234	24.28	Av	.1	9.9	34.28	-	-	52.31	-18.03
3	.642	21.5	Pk	0	9.9	31.4	56	-24.6	-	-
4	.645	14.29	Av	0	9.9	24.19	-	-	46	-21.81
5	.903	20.89	Pk	0	9.9	30.79	56	-25.21	-	-
6	.903	13.44	Av	0	9.9	23.34	-	-	46	-22.66
7	14.199	20.2	Pk	.1	10.1	30.4	60	-29.6	-	-
8	14.253	6.85	Av	.1	10.1	17.05	-	-	50	-32.95
9	20.391	17.93	Pk	.2	10.2	28.33	60	-31.67	-	-
10	20.391	2.21	Av	.2	10.2	12.61	-	-	50	-37.39
23	1.935	20.94	Pk	0	10	30.94	56	-25.06	-	-
24	1.941	9.55	Av	0	10	19.55	-	-	46	-26.45

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS - TERMINATED



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit	Margin (dB)	Avg Limit	Margin (dB)
11	.24	34.74	Pk	.1	9.9	44.74	62.1	-17.36	-	-
12	.24	25.8	Av	.1	9.9	35.8	-	-	52.1	-16.3
13	.378	28.31	Pk	.1	9.9	38.31	58.32	-20.01	-	-
14	.381	9.45	Av	.1	9.9	19.45	-	-	48.26	-28.81
15	.633	25.35	Pk	0	9.9	35.25	56	-20.75	-	-
16	.642	13.77	Av	0	9.9	23.67	-	-	46	-22.33
17	1.14	24.83	Pk	0	9.9	34.73	56	-21.27	-	-
18	1.152	12.26	Av	0	9.9	22.16	-	-	46	-23.84
19	14.235	27.58	Pk	.1	10.1	37.78	60	-22.22	-	-
20	14.25	11.17	Av	.1	10.1	21.37	-	-	50	-28.63
21	20.376	33.56	Pk	.2	10.2	43.96	60	-16.04	-	-
22	20.376	2.3	Av	.2	10.2	12.7	-	-	50	-37.3

Pk - Peak detector

Av - Average detection

10. 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.

RSS-210 Annex B.6: Carrier frequency stability shall be maintained to $\pm 0.01\%$ (± 100 ppm).

TEST PROCEDURE

C63.10

RESULTS

No non-compliance noted.

Startup

Reference Frequency: EUT Channel xxxxxx MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.5604520	1.401	± 100
5.00	40	13.5604620	0.664	± 100
5.00	30	13.5604760	-0.369	± 100
5.00	20	13.5604710	0.000	± 100
5.00	10	13.5604840	-0.959	± 100
5.00	0	13.5604760	-0.369	± 100
5.00	-10	13.5604600	0.811	± 100
5.00	-20	13.5604670	0.295	± 100
4.50	20	13.5604570	1.032	± 100
5.5	20	13.5604910	-1.475	± 100

2 Minutes

Reference Frequency: EUT Channel xxxxxx MHz @ 20°C				
Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.5604590	0.885	± 100
5.00	40	13.5604620	0.664	± 100
5.00	30	13.5604740	-0.221	± 100
5.00	20	13.5604710	0.000	± 100
5.00	10	13.5604870	-1.180	± 100
5.00	0	13.5604840	-0.959	± 100
5.00	-10	13.5604630	0.590	± 100
5.00	-20	13.5604580	0.959	± 100
4.50	20	13.5604690	0.147	± 100
5.5	20	13.5604910	-1.475	± 100

5 Minutes

Reference Frequency: EUT Channel xxxxxx MHz @ 20°C				
Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.5604550	0.885	± 100
5.00	40	13.5604640	0.221	± 100
5.00	30	13.5604670	0.000	± 100
5.00	20	13.5604670	0.000	± 100
5.00	10	13.5604860	-1.401	± 100
5.00	0	13.5604850	-1.327	± 100
5.00	-10	13.5604660	0.074	± 100
5.00	-20	13.5604580	0.664	± 100
4.50	20	13.5604670	0.000	± 100
5.5	20	13.5604690	-0.147	± 100

10 Minutes

Reference Frequency: EUT Channel xxxxxx MHz @ 20°C Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
5.00	50	13.5604550	1.032	± 100
5.00	40	13.5604630	0.442	± 100
5.00	30	13.5604640	0.369	± 100
5.00	20	13.5604690	0.000	± 100
5.00	10	13.5604870	-1.327	± 100
5.00	0	13.5604840	-1.106	± 100
5.00	-10	13.5604660	0.221	± 100
5.00	-20	13.5604520	1.254	± 100
4.50	20	13.5604720	-0.221	± 100
5.5	20	13.5604660	0.221	± 100

TEST INFORMATION

Date: 05/02/2018

Tester: Jeffrey Cabrera