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

CERTIFICATION TEST REPORT

FOR

VERTEX MULTI-POINT TOXIC GAS MONITORING SYSTEM

MODEL NUMBER: Vertex/Vertex M

FCC ID: 2ACSZVTXVTXM
IC: 12190A-VTXVTXM

REPORT NUMBER: R11612827-E1

ISSUE DATE: 2018-11-08

Prepared for
HONEYWELL ANALYTICS INC.
405 BARCLAY BLVD.
LINCOLNSHIRE, IL 60069 USA

Prepared by
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NVLAP TESTING

NVLAP Lab code: 200246-0

Revision History

Rev.	Issue Date	Revisions	Revised By
1	2018-10-10	Initial Issue	Brian T. Kiewra
2	2018-11-05	Updated model name	Lariah Ijames
3	2018-11-08	Revised Section 9 to include unterminated data. Revised Section 8.1.1 9kHz-30MHz data to account for AV/PK limits and 9kHz-30MHz data FCC Limit (300m/30m/3m). Added statement declaring protocol supported and tested in Section 5.1.	Brian T. Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: HONEYWELL ANALYTICS INC.
405 BARCLAY BLVD.
LINCOLNSHIRE, IL 60069 USA

EUT DESCRIPTION: VERTEX MULTI-POINT TOXIC GAS MONITORING SYSTEM

MODEL: Vertex/Vertex M

SERIAL NUMBER: 0291-15347

DATE TESTED: 2017-03-14 to 2017-03-21

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	Compliant
ISED CANADA RSS-210 Issue 9	Compliant
ISED CANADA RSS-GEN Issue 5	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
Project Engineer
UL – Consumer Technology Division

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 5 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 Suite B, Perimeter Park Drive, Morrisville, NC 27560 USA.

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

2800 Suite B Perimeter Park Dr., 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	2.00%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
RF output power, radiated (SAC)	4.52 dB
Unwanted Emissions, conducted	3.05 dB
All emissions, radiated	5.36 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a gas analyzer utilizing 13.56 MHz RFID to determine the Chemcassette Spool inserted into the analyzer. Manufacturer declared that only ISO 15693 protocol is supported and, as such, only ISO 15693 tested.

5.2. MAXIMUM FUNDAMENTAL FIELD STRENGTH

The testing was performed at 3 meter. The transmitter maximum E-field at 30 meter distance is 12.39 dBuV/m which is converted from the 3 meter data.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a trace loop antenna with an area of 0.0001 m^2.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 1.21 b 01

The EUT driver software installed in the host support equipment during testing was Tera Term Pro Version 2.3

The test utility macro used during testing was RFID Read (used to continuously read tag and display contents)

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT is intended to operate rack mounted in only one orientation, therefore was tested in the intended orientation. The RFID radio only operates in one mode (13.56 MHz RFID), and was configured to continuously transmit for testing.

5.6. MODIFICATIONS

No modifications were made during testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST			
Description	**Manufacturer**	**Model**	**Serial Number**
Laptop	Dell	H5914 A03	723PC91
Laptop Power Supply	Dell	FA90PS0-00	CN-0GX808-73245-95D-1065-A01
Power Distribution Module	Honeywell	1295A0413	5340PWR03170002

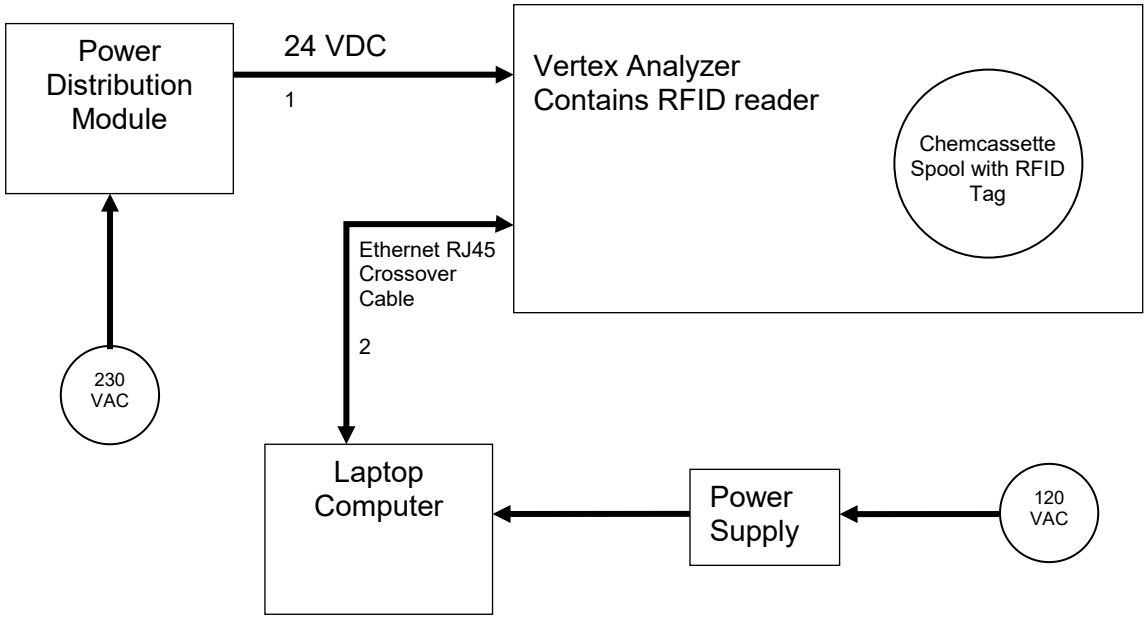
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length m**	**Remarks**
1	TIER-1	3	Multi-pin	Unshielded	<3m	None
2	Ethernet	1	RJ-45	Unshielded	<3m	None

TEST SETUP

The EUT is configured standalone, instead of in its intended frame. The EUT was connected to the power distribution module, which would also be located in the intended frame. An Ethernet cable was connected between the laptop and the analyzer for control/monitoring the RFID radio. Software on the laptop exercised the radio and monitored tag read success/failure.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	**(Loop Ant.)**			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2016-12-28	2017-12-31
	30-1000 MHz				
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2016-06-27	2017-06-30
	Gain-Loss Chains				
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2016-10-04	2017-10-04
N-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2016-06-26	2017-06-30
	Receiver & Software				
SA0026	Spectrum Analyzer	Agilent	N9030A	2017-02-17	2018-07-28
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

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	2016-06-15	2017-06-30
HI0081	Environmental Meter	Springfield	91905	2016-04-26	2017-04-26
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2016-08-24	2017-08-24
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2016-08-23	2017-08-23
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2016-06-09	2017-06-30
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Miscellaneous (if needed)				
MM0167	Multi-meter	Agilent	U1232A	2016-10-07	2017-10-31
LISN008	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	2016-10-31	2017-10-31

Test Equipment Used – Frequency Stability Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2016-03-22	2017-03-31
1100502	Temp/Humid Chamber	Cincinnati Sub-Zero	ZPH-8-3.5-SCT/AC	2016-06-06	2017-06-06
139843	Temp/Humid/Pressure Meter	Control Co./Fisher	14-650-118	2016-02-19	2017-02-19
MM0167	Multi-meter	Agilent	U1232A	2016-10-07	2017-10-31
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA

7. 20 dB AND 99% BANDWIDTH

LIMIT

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.

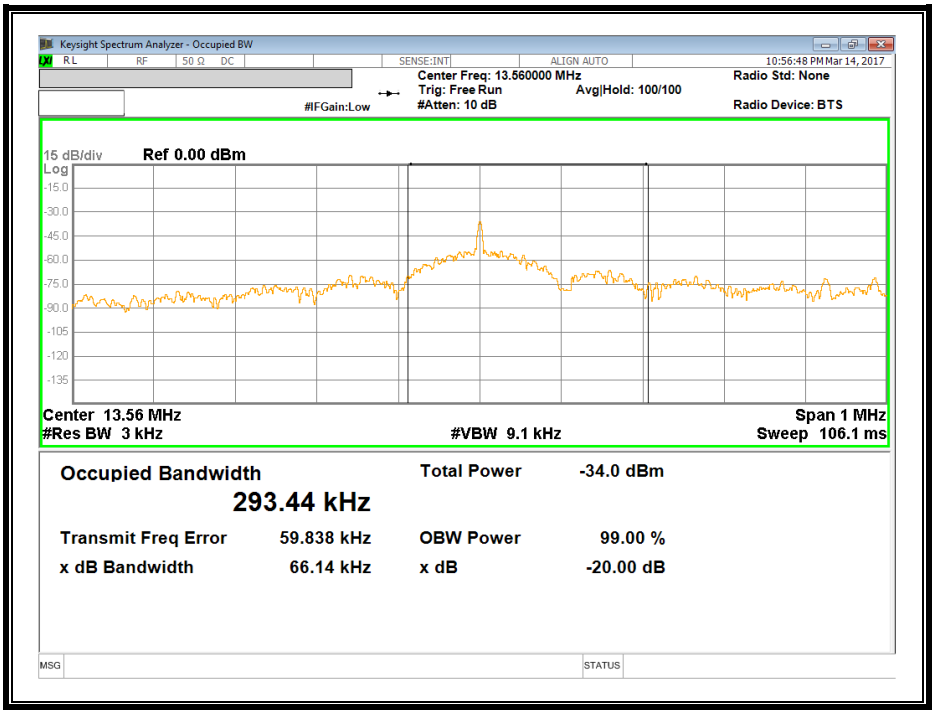
TEST PROCEDURE

The transmitter output is measured over the air by a spectrum analyzer. The RBW is set to 1-5% of the 20 dB or 99% bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

RESULTS

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
13.56	66.14	293.44

99% BANDWIDTH



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 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.

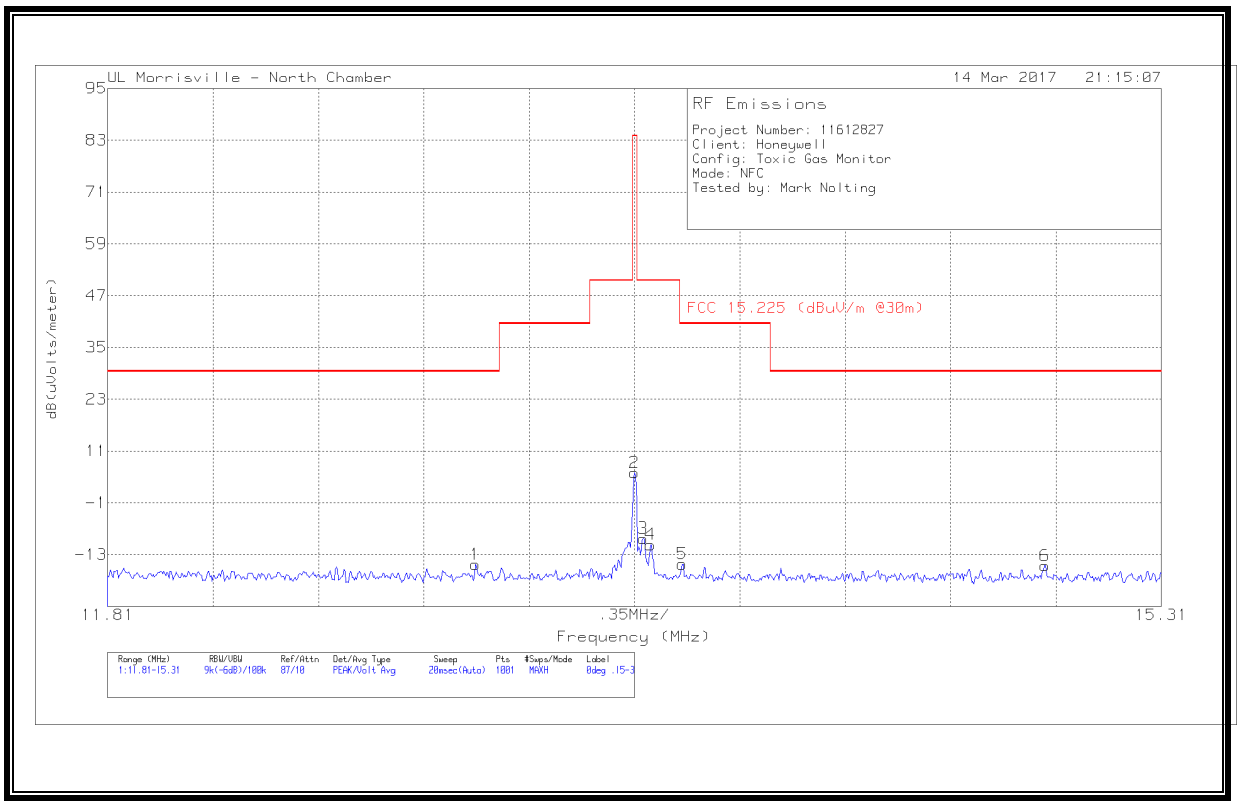
RESULTS

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

Note: All measurements were made at a test distance of 3 m. The 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*Log (specification distance / test distance).

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.

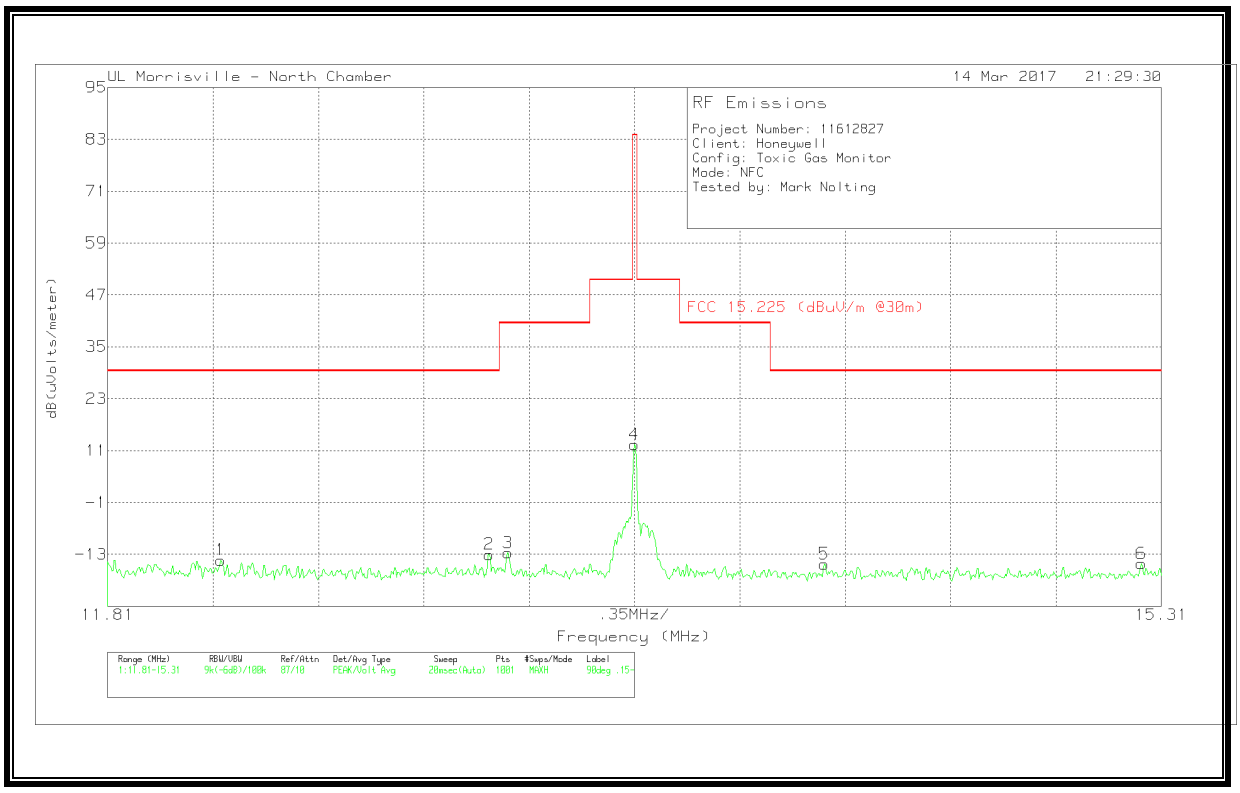
Fundamental – 0 deg



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	13.0315	13.74	Pk	10.4	.6	-40	-15.26	29.5	-44.76	0
2	13.56	34.95	Pk	10.4	.6	-40	5.95	84	-78.05	0
3	13.588	19.73	Pk	10.4	.6	-40	-9.27	50.5	-59.77	0
4	13.6125	18.31	Pk	10.4	.6	-40	-10.69	50.5	-61.19	0
5	13.7175	13.81	Pk	10.4	.6	-40	-15.19	40.5	-55.69	0
6	14.92325	13.5	Pk	10.3	.6	-40	-15.6	29.5	-45.1	0

Pk - Peak detector

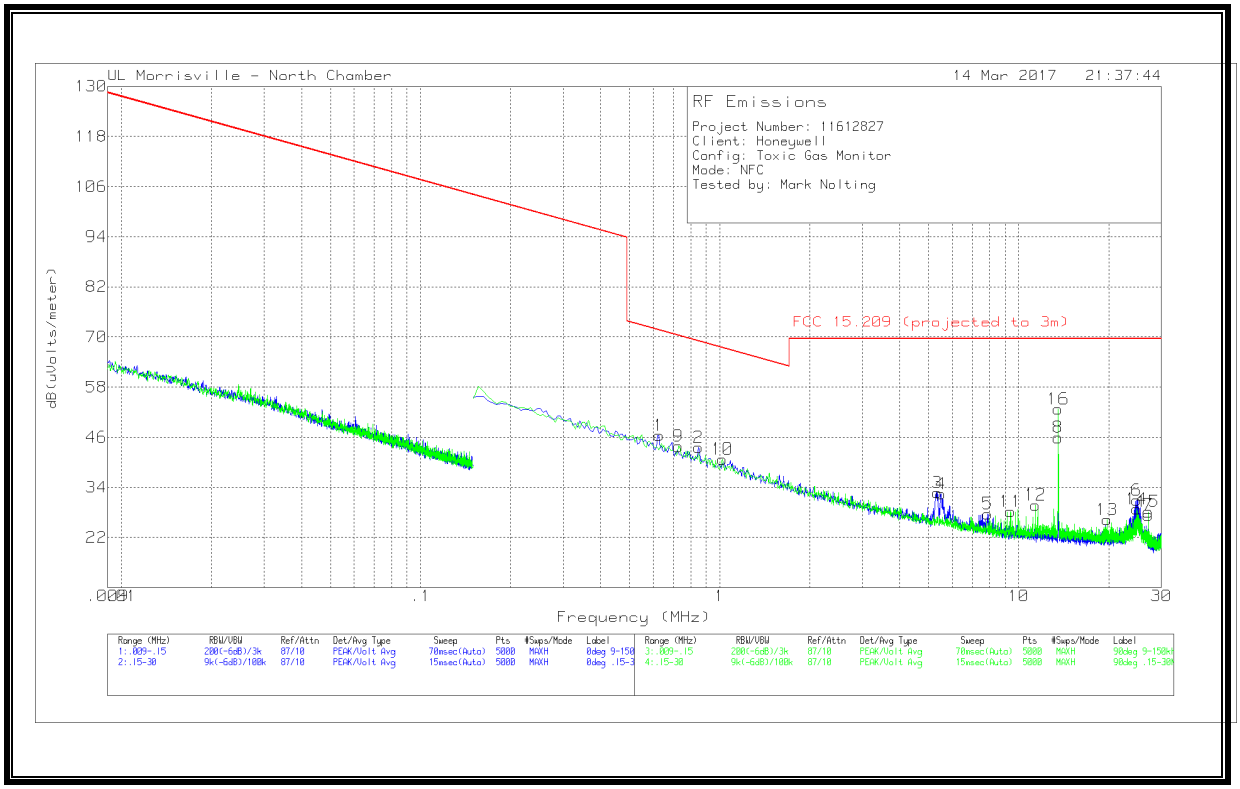
Fundamental – 90 deg



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	12.1845	14.57	Pk	10.5	.6	-40	-14.33	29.5	-43.83	50
2	13.077	15.99	Pk	10.4	.6	-40	-13.01	29.5	-42.51	50
3	13.14	16.37	Pk	10.4	.6	-40	-12.63	40.5	-53.13	50
4	13.56	41.39	Pk	10.4	.6	-40	12.39	84	-71.61	50
5	14.19	13.77	Pk	10.4	.6	-40	-15.23	29.5	-44.73	50
6	15.2435	13.85	Pk	10.3	.7	-40	-15.15	29.5	-44.65	50

Pk - Peak detector

Spurious



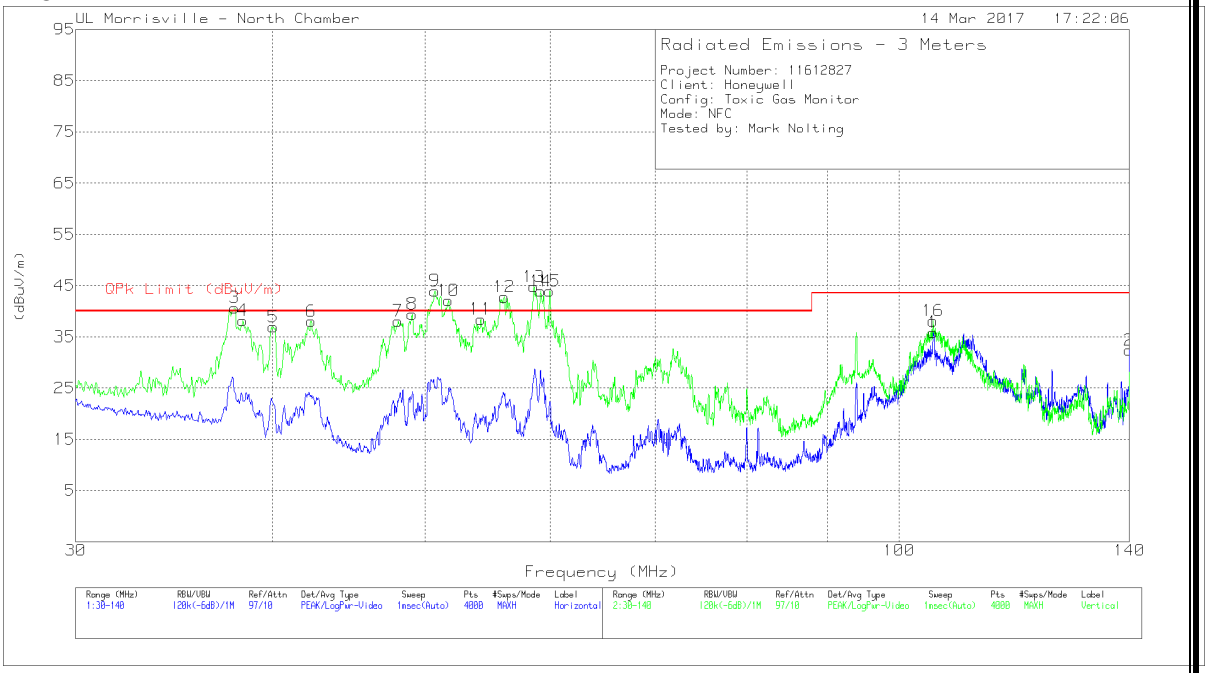
Note: Plot is for reference only to identify frequencies of interest.

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Distance Correction Factor (dB)	Corrected Reading dB(uV/m)	FCC 15.209 QP	FCC 15.209 AV	FCC 15.209 PK	Worst-Case Margin (dB)	Azimuth (Degs)
1	.62768	35.54	Pk	10.8	.1	-40	6.44	31.65	-	-	-25.21	0-360
2	.84861	32.72	Pk	10.7	.1	-40	3.52	29.03	-	-	-25.51	0-360
3	5.3388	21.33	Pk	11	.4	-40	-7.27	29.54	-	-	-36.81	0-360
4	5.49405	21	Pk	11	.4	-40	-7.6	29.54	-	-	-37.14	0-360
5	7.88842	16.48	Pk	10.7	.5	-40	-12.32	29.54	-	-	-41.86	0-360
6	24.79232	21.05	Pk	9.1	.8	-40	-9.05	29.54	-	-	-38.59	0-360
7	27.12101	17.91	Pk	8.6	.9	-40	-12.59	29.54	-	-	-42.13	0-360
9	.72919	33.01	Pk	10.7	.1	-40	3.81	30.35	-	-	-26.54	0-360
10	1.02177	29.54	Pk	11	.2	-40	0.74	27.42	-	-	-26.68	0-360
11	9.39311	17.32	Pk	10.4	.5	-40	-11.78	29.54	-	-	-41.32	0-360
12	11.36951	18.67	Pk	10.5	.6	-40	-10.23	29.54	-	-	-39.77	0-360
13	19.74085	15.59	Pk	9.9	.8	-40	-13.71	29.54	-	-	-43.25	0-360
14	24.78336	18.94	Pk	9.1	.8	-40	-11.16	29.54	-	-	-40.7	0-360
15	27.12101	18.65	Pk	8.6	.9	-40	-11.85	29.54	-	-	-41.39	0-360

Pk - Peak detector

8.1.2. TX SPURIOUS EMISSION 30 TO 140 MHz

PLOT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	105.0941	50.77	Pk	16	-30.9	35.87	43.52	-7.65	0-360	299	H
2	140	45.5	Pk	17.5	-30.6	32.4	43.52	-11.12	0-360	199	H
3	37.7395	50.49	Qp	20.2	-31.6	39.09	40	-.91	97	100	V
4	38.3071	47.2	Qp	19.8	-31.6	35.4	40	-4.6	90	100	V
5	40.0102	48.72	Qp	18.4	-31.6	35.52	40	-4.48	91	100	V
6	42.1171	49.76	Qp	16.9	-31.6	35.06	40	-4.94	122	100	V
7	48.0721	52.17	Qp	13.4	-31.5	34.07	40	-5.93	226	100	V
8	49.0744	53.69	Qp	13	-31.5	35.19	40	-4.81	251	100	V
9	50.7128	56.42	Qp	12.4	-31.3	37.52	40	-2.48	341	100	V
10	51.8525	56.09	Qp	12.1	-31.4	36.79	40	-3.21	271	100	V
11	54.2517	54.19	Qp	11.9	-31.3	34.79	40	-5.21	306	100	V
12	56.0467	57.02	Qp	11.8	-31.2	37.62	40	-2.38	320	100	V
13	58.83	58.03	Qp	11.8	-31.4	38.43	40	-1.57	271	100	V
14	59.3045	58.27	Qp	11.8	-31.3	38.77	40	-1.23	251	100	V
15	60	58.24	Qp	11.8	-31.4	38.64	40	-1.36	103	101	V
16	105.1035	52.6	Qp	16	-30.9	37.7	43.52	-5.82	3	100	V

Pk - Peak detector
Qp - Quasi-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 50μH/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 (dBμV)	
	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.		

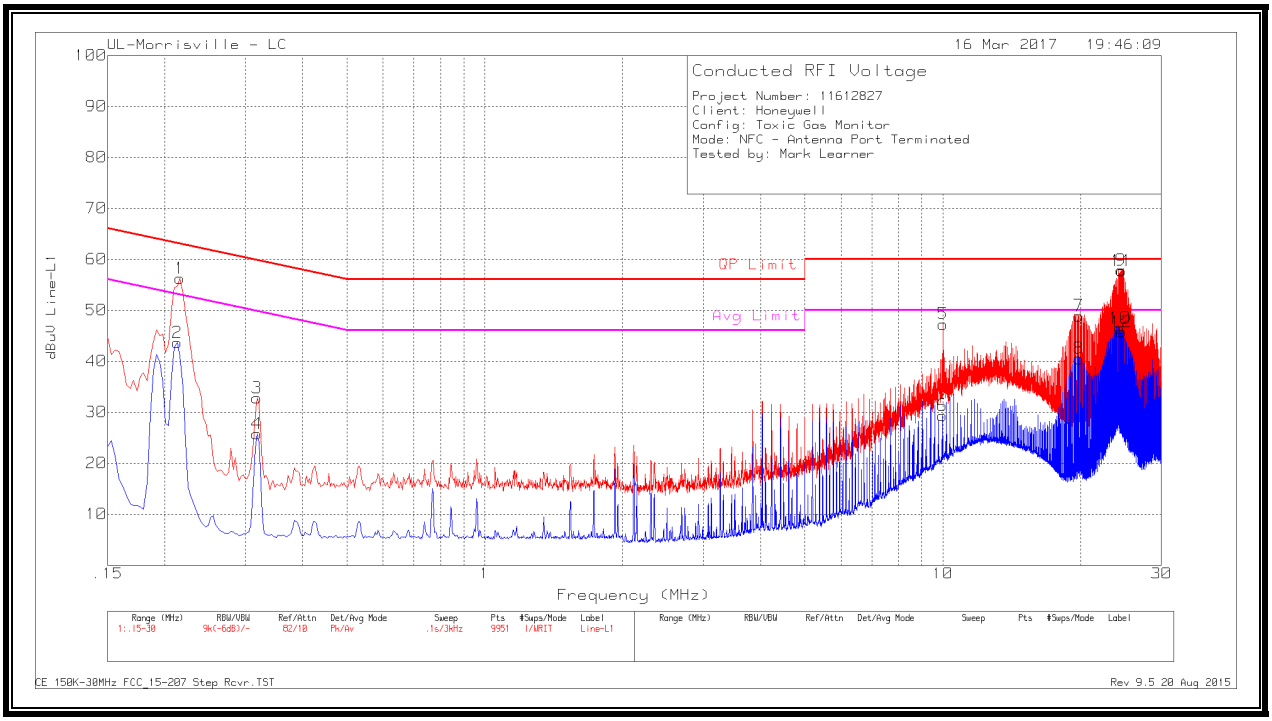
TEST PROCEDURE

ANSI C63.10

RESULTS

No non-compliance noted

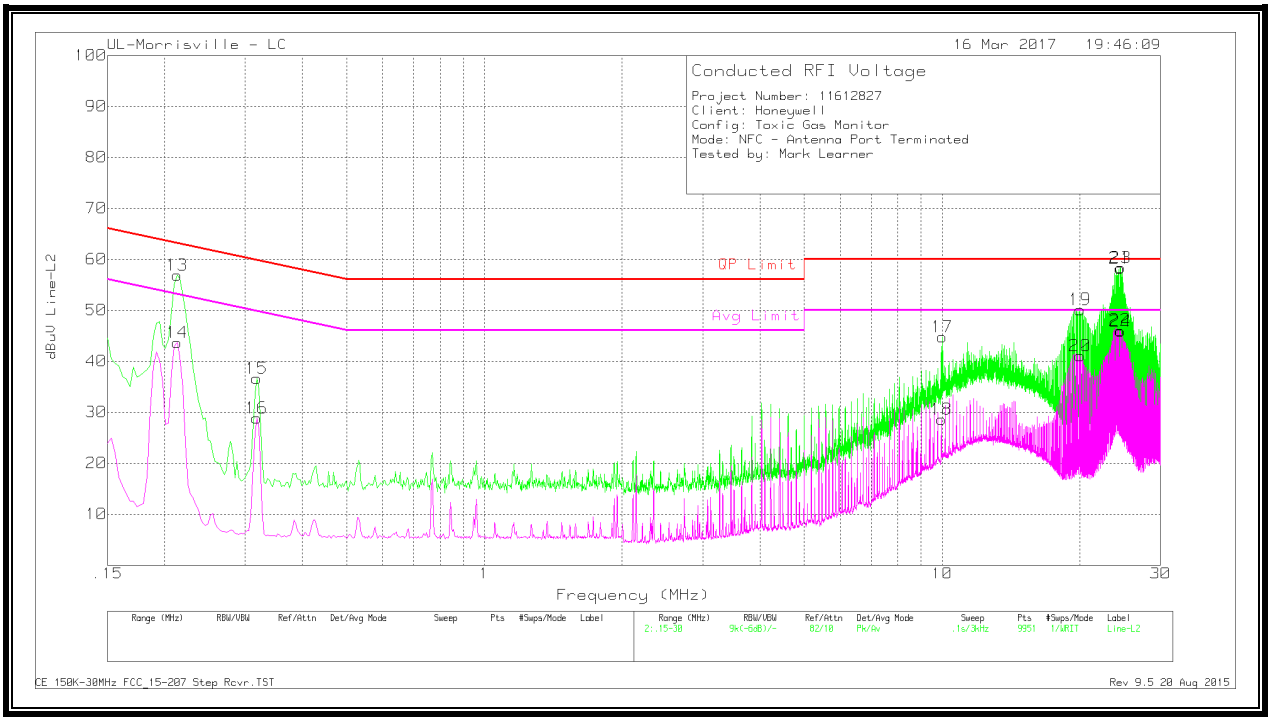
LINE 1 RESULTS - TERMINATED



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	.216	46.13	Pk	.1	10	56.23	62.97	-6.74	-	-
2	.213	33.53	Av	.1	10	43.63	-	-	53.09	-9.46
3	.318	22.74	Pk	.1	10	32.84	59.76	-26.92	-	-
4	.318	15.69	Av	.1	10	25.79	-	-	49.76	-23.97
5	10.002	36.9	Pk	.1	10.3	47.3	60	-12.7	-	-
6	9.987	18.99	Av	.1	10.3	29.39	-	-	50	-20.61
7	19.821	38.2	Pk	.2	10.5	48.9	60	-11.1	-	-
8	19.821	29.82	Av	.2	10.5	40.52	-	-	50	-9.48
9	24.4583	44.28	Qp	.3	10.6	55.18	60	-4.82	-	-
10	24.4583	34.16	Av	.3	10.6	45.06	-	-	50	-4.94
11	24.56512	44.17	Qp	.3	10.6	55.07	60	-4.93	-	-
12	24.56512	34.64	Av	.3	10.6	45.54	-	-	50	-4.46

Pk - Peak detector
Qp - Quasi-Peak detector
Av - Average detection

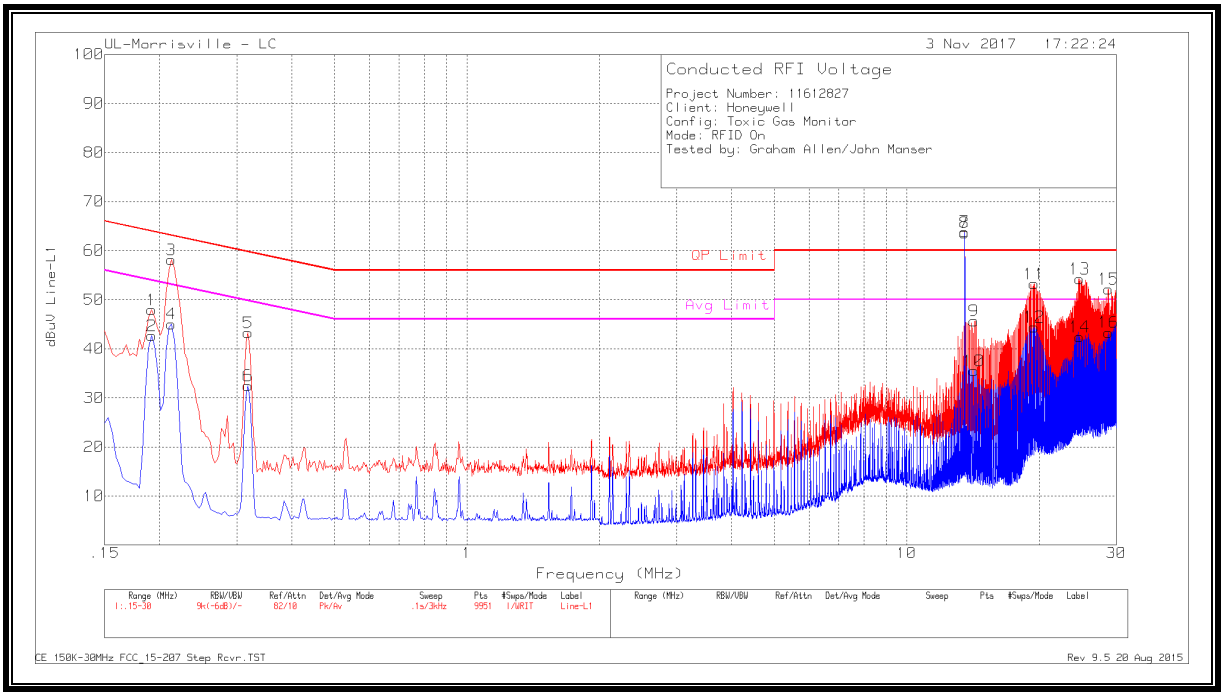
LINE 2 RESULTS - TERMINATED



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)
13	.213	46.75	Pk	.1	10	56.85	63.09	-6.24	-	-
14	.213	33.57	Av	.1	10	43.67	-	-	53.09	-9.42
15	.318	26.5	Pk	.1	10	36.6	59.76	-23.16	-	-
16	.318	18.79	Av	.1	10	28.89	-	-	49.76	-20.87
17	10.011	34.35	Pk	.1	10.3	44.75	60	-15.25	-	-
18	9.981	18.24	Av	.1	10.3	28.64	-	-	50	-21.36
19	20.025	39.42	Pk	.2	10.5	50.12	60	-9.88	-	-
20	20.025	30.36	Av	.2	10.5	41.06	-	-	50	-8.94
21	24.45841	44.34	Qp	.2	10.6	55.14	60	-4.86	-	-
22	24.45841	33.33	Av	.2	10.6	44.13	-	-	50	-5.87
23	24.56432	43.96	Qp	.2	10.6	54.76	60	-5.24	-	-
24	24.56432	34.05	Av	.2	10.6	44.85	-	-	50	-5.15

Pk - Peak detector
Qp - Quasi-Peak detector
Av - Average detection

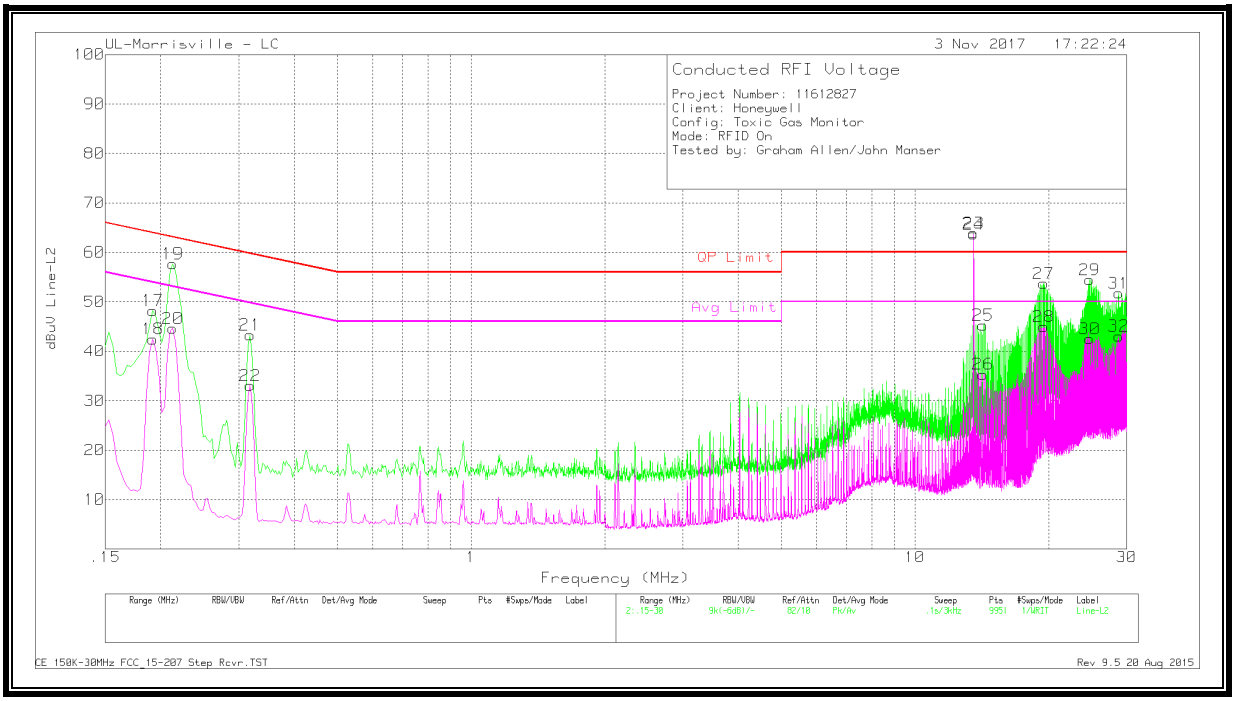
LINE 1 RESULTS - UNTERMINATED



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	.192	37.78	Pk	.2	10	47.98	63.95	-15.97	-	-
2	.192	32.46	Av	.2	10	42.66	-	-	53.95	-11.29
3	.21415	42.54	Qp	.1	10	52.64	63.04	-10.4	-	-
4	.21415	34.22	Av	.1	10	44.32	-	-	53.04	-8.72
5	.318	33.3	Pk	.1	9.9	43.3	59.76	-16.46	-	-
6	.318	22.52	Av	.1	9.9	32.52	-	-	49.76	-17.24
9	14.226	35.49	Pk	.1	10.1	45.69	60	-14.31	-	-
10	14.226	25.31	Av	.1	10.1	35.51	-	-	50	-14.49
11	19.497	42.81	Pk	.2	10.2	53.21	60	-6.79	-	-
12	19.497	34.04	Av	.2	10.2	44.44	-	-	50	-5.56
13	24.7621	38.47	Qp	.2	10.2	48.87	60	-11.13	-	-
14	24.7621	32.06	Av	.2	10.2	42.46	-	-	50	-7.54
15	28.776	41.59	Pk	.3	10.3	52.19	60	-7.81	-	-
16	28.776	32.75	Av	.3	10.3	43.35	-	-	50	-6.65

Pk - Peak detector
Qp - Quasi-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)
17	.192	38.06	Pk	.2	10	48.26	63.95	-15.69	-	-
18	.192	32.29	Av	.2	10	42.49	-	-	53.95	-11.46
19	.2125	43.07	Qp	.1	10	53.17	63.11	-9.94	-	-
20	.2125	34.58	Av	.1	10	44.68	-	-	53.11	-8.43
21	.318	33.34	Pk	.1	9.9	43.34	59.76	-16.42	-	-
22	.318	23.06	Av	.1	9.9	33.06	-	-	49.76	-16.7
25	14.226	35.09	Pk	.1	10.1	45.29	60	-14.71	-	-
26	14.226	25.16	Av	.1	10.1	35.36	-	-	50	-14.64
27	19.4966	41.61	Qp	.1	10.2	51.91	60	-8.09	-	-
28	19.4966	34.76	Av	.1	10.2	45.06	-	-	50	-4.94
29	24.7613	39.23	Qp	.2	10.2	49.63	60	-10.37	-	-
30	24.7613	31.89	Av	.2	10.2	42.29	-	-	50	-7.71
31	28.776	41.13	Pk	.3	10.3	51.73	60	-8.27	-	-
32	28.776	32.49	Av	.3	10.3	43.09	-	-	50	-6.91

Pk - Peak detector
Qp - Quasi-Peak detector
Av - Average detection

10. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±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 ±0.01% (±100 ppm).

TEST PROCEDURE

ANSI C63.10

RESULTS

No non-compliance noted.

Startup

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC **Limit: ± 100 ppm = 1.356 kHz**				
Power Supply (Vac)	**Environment Temperature (ºC)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
120.00	50	13.5603786	10.619	± 100
120.00	40	13.5604174	7.756	± 100
120.00	30	13.5604693	3.928	± 100
120.00	***20***	***13.5605226***	***0.000***	***± 100***
120.00	10	13.5605487	-1.927	± 100
120.00	0	13.5603562	12.267	± 100
120.00	-10	13.5605039	1.381	± 100
120.00	-20	13.5606014	-5.812	± 100
102.00	20	13.5606153	-6.836	± 100
138	20	13.5605850	-4.600	± 100

2 Minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vac)	**Environment Temperature (ºC)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
120.00	50	13.5603883	9.853	± 100
120.00	40	13.5604294	6.828	± 100
120.00	30	13.5604773	3.290	± 100
120.00	***20***	***13.5605219***	***0.000***	***± 100***
120.00	10	13.5603166	15.141	± 100
120.00	0	13.5603742	10.897	± 100
120.00	-10	13.5604014	8.890	± 100
120.00	-20	13.5605831	-4.510	± 100
102.00	20	13.5604137	7.979	± 100
138	20	13.5605776	-4.101	± 100

5 Minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vac)	**Environment Temperature (ºC)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
120.00	50	13.5600299	35.723	± 100
120.00	40	13.5603887	9.261	± 100
120.00	30	13.5604876	1.969	± 100
120.00	***20***	***13.5605143***	***0.000***	***± 100***
120.00	10	13.5604777	2.697	± 100
120.00	0	13.5603222	14.164	± 100
120.00	-10	13.5602713	17.921	± 100
120.00	-20	13.5605550	-3.005	± 100
102.00	20	13.5605079	0.467	± 100
138	20	13.5606047	-6.670	± 100

10 Minutes

Reference Frequency: EUT Channel 13.56 MHz @ 20ºC Limit: ± 100 ppm = 1.356 kHz				
Power Supply (Vac)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
120.00	50	13.5603786	10.619	± 100
120.00	40	13.5604174	7.756	± 100
120.00	30	13.5604693	3.928	± 100
120.00	***20***	***13.5605226***	***0.000***	***± 100***
120.00	10	13.5605487	-1.927	± 100
120.00	0	13.5603562	12.267	± 100
120.00	-10	13.5605039	1.381	± 100
120.00	-20	13.5606014	-5.812	± 100
102.00	20	13.5606153	-6.836	± 100
138	20	13.5605850	-4.600	± 100

TEST INFORMATION

Date: 3/21/2017
Project No: 11612827
Tester: Niklas Haydon / Mark Learner