FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

POWER METER RF ADAPTER

MODEL NUMBER: ST-VM-TESEPROBE-W-AD (RF ADAPTER)

FCC ID: Y8E-VM2013

REPORT NUMBER: R10008567-ADRF

ISSUE DATE: 2013-11-27

Prepared for
VISION METERING, LLC
7 ROSS CANNON ST
YORK, SC
29745, USA

Prepared by
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12 LABORATORY DR.
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NVLAP LAB CODE 200246-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2013-11-27	Initial Issue	Jeff Moser

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: VISION METERING LLC
7 ROSS CANNON ST
YORK, SC 29745, USA

EUT DESCRIPTION: POWER METER RF ADAPTER

MODEL: ST-VM-TESEPROBE-W-AD

SERIAL NUMBER: Non-serialized samples

DATE TESTED: 2013-09-13 through 2013-10-24

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

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, any agency of the Federal Government, or any agency of any government.

Approved & Released
For UL LLC By:

Mike Antola
EMC Project Lead
UL - WiSE
Wireless, **I**nteroperability, **S**ecurity/Payments & **E**MC

Prepared By:

Jeff Moser
EMC Program Manager
UL - WiSE

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, 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 12 Laboratory Dr., Research Triangle Park, NC 27709, USA.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2002460.htm.

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
Conducted Disturbance, 0.15 to 30 MHz	+/- 2.5 dB
Radiated Disturbance, 30 to 1000 MHz	+/- 3.4 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a 903-927 MHz transceiver device for Power Meters. The EUT is sold as part of a kit (model number ST-VM-TESEPROBE-W) that includes the RF Adapter Reader (ST-VM-TESEPROBE-W-AD) and Optical Head Reader (ST-VM-TESEPROBE-W-HD). This report covers the RF Adapter portion of the kit.

The radio module is manufactured by TestPro.

5.2. MAXIMUM OUTPUT E-FIELD STRENGTH

The transmitter has a maximum output peak E-field as follows:

Frequency Range (MHz)	Mode	Output PK E-field Strength (dBuV/m)
903-927	RF Adapter (GFSK)	93.86

Note: Maximum quasi-peak for the RF Adapter was 93.73dBuV/m.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a monopole antenna, with a maximum gain of 3 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was A590, rev. 2.0.

The EUT driver software installed during testing was TesPro USB Optical Driver, rev. 1.01.

The test utility software used during testing was TS-SPRF900, rev. 2.0.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest peak E-field.

During testing of the RF adapter, it was connected directly to a USB port of a laptop PC, similar to its usage in the field. The laptop was tested in this one (rest) orientation.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC	Lenovo	7661-CC2	L3-AB229	NA
AC Adapter	Lenovo	92P1109	11S92P1109Z1ZBTZ 718B5W	NA
USB to DB9 Serial Adapter	Aten	UC-232A	Z3844194BL60079	NA
Partial meter face-plate with ANSI type 2 optical port	-	-	-	NA

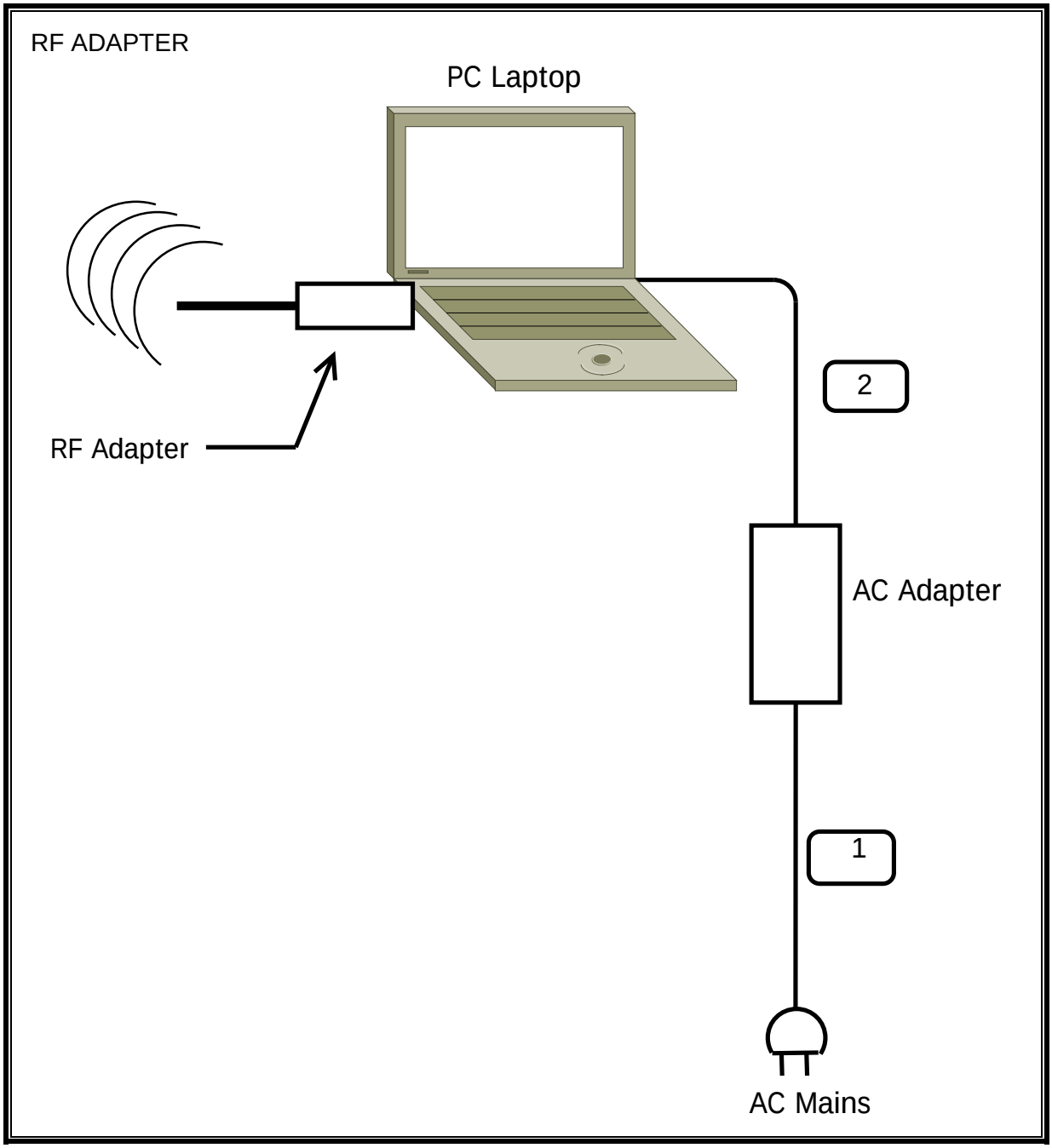
I/O CABLES

I/O Cable List					
Cable No	**Port**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC In	AC inlet	Unshielded	1	Detachable Ac power cord to AC adapter.
2	DC Out	NA	Unshielded	1.7	Non-detachable power cable from AC adaper to laptop PC.
3	USB	USB	Shielded	0.3	USB-to-DB9 adapter cable between laptop PC and optical port.
4	DB9	DB9	Unshielded	2.4	2-conductor cable to optical port of meter face.

TEST SETUP

During testing of the RF adapter, it was connected directly to a USB port of a laptop PC, similar to its usage in the field.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Antenna-port Measurements

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0016	Spectrum Analyzer	Agilent	N9030A	2013-09-04	2014-09-30
HI0041	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2013-01-25	2014-01-25

Radiated Disturbance Emissions

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0037	Loop Antenna (Low Range)	Electro-Metrics	EM-6871	2013-06-19	2014-06-30
AT0036	Loop Antenna (High Range)	Electro-Metrics	EM-6872	2013-06-20	2014-06-30
AT0022	Log-periodic Antenna, 200 MHz to 1000 MHz	Chase	UPA6109	2013-01-29	2014-01-31
AT0025	Biconical Antenna, 30 to 300 MHz	Schaffner-Chase EMC Ltd.	VBA6106A	2013-06-14	2014-06-30
AT0062	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2013-08-27	2014-08-31
SAC_C (Biconical 3m location)	Gain-Loss string for biconical antenna at 3m	Various	Various	2013-09-06	2014-09-30
SAC_D (Log-Periodic 3m location)	Gain-Loss string for log-periodic antenna at 3m	Various	Various	2013-09-06	2014-09-30
SAC_E_LR (Loop & Rod 3m location)	Gain-Loss string for loop/rod antenna at 3m	Various	Various	2013-09-06	2014-09-30
SAR003	Spectrum Analyzer / Receiver	Rohde & Schwarz	ESIB40 (1088.7490.40)	2013-09-03	2014-09-30
SA0016	Spectrum Analyzer	Agilent	N9030A	2013-09-04	2014-09-30
AMP011	RF Amp, 1-20GHz	Miteq	AMF-6D-01002000-22-10P	2013-09-04	2014-09-30
HI0034	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2013-01-25	2014-01-25
72669	Band Reject Filter: 902-928MHz	Lorch Microwave	5BR8-915/26-S	2013-07-14	2014-07-31
HPF005	High-pass Filter: 1500-1800MHz	Microtronics	HPM50114-01	2013-09-04	2014-09-30
HPF009	High-pass Filter: 1000-10,000GHz	Microtronics	HPM17672	2013-10-14	2014-10-30
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

Conducted Disturbance Emissions - Voltage

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0015	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2013-09-04	2014-09-30
ATA016	Coaxial cable, 20 ft., BNC -male to BNC-male	UL	RG-223	2013-09-05	2014-09-30
HI0069	Temp/Humid/Pressure Meter	Cole-Parmer	99760-00	2013-06-17	2014-06-17
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
ATA508	Transient Limiter, 0.009 to 100 MHz	Electro-Metrics	EM 7600	2013-09-06	2014-09-30
LISN002	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2013-09-03	2014-09-30

7. TEST RESULTS

7.1.1. 99% BANDWIDTH – RF ADAPTER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

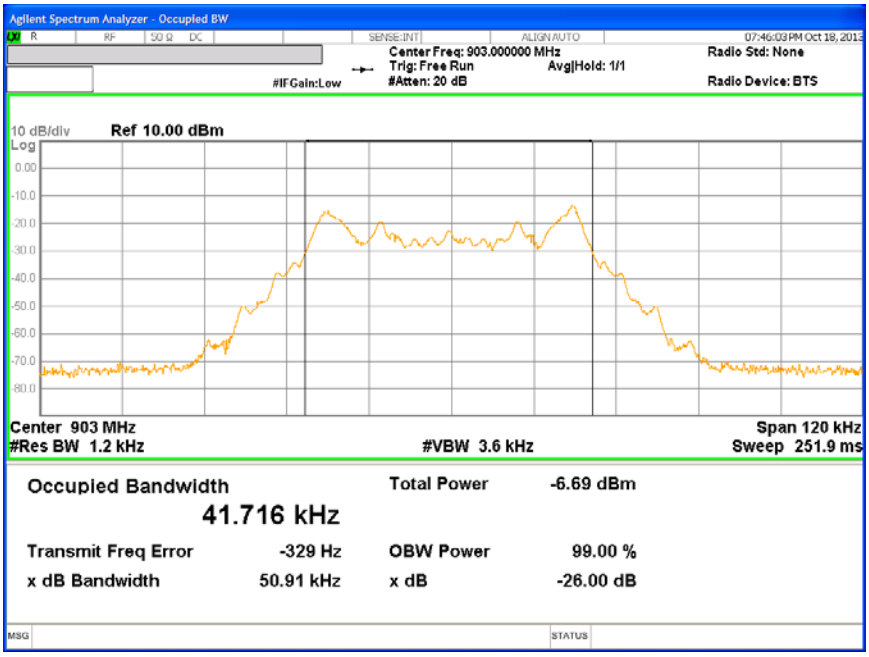
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

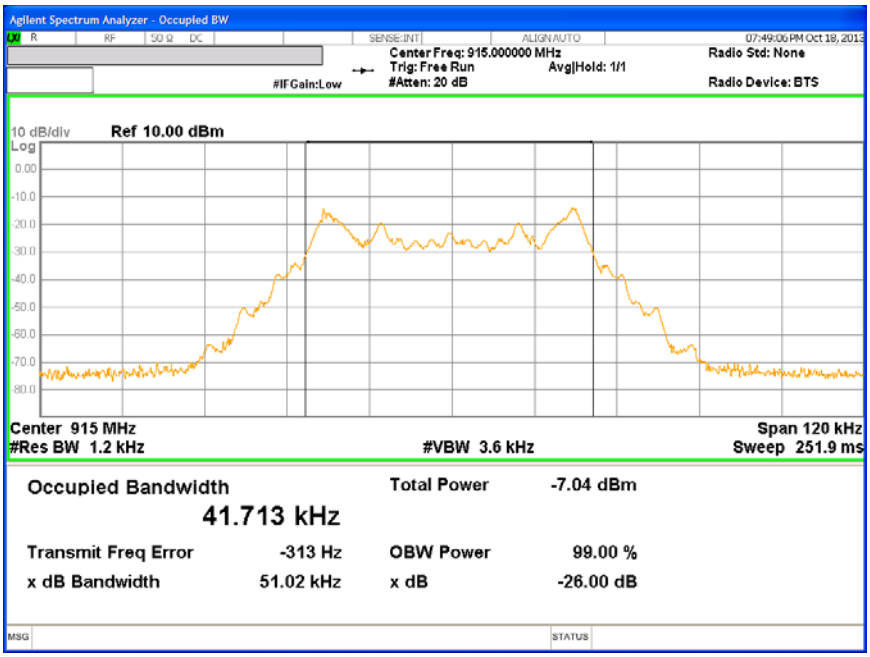
Channel	Frequency (MHz)	99% Bandwidth (MHz)	99% Bandwidth (kHz)
Low	903	0.0417	41.716
Middle	915	0.0417	41.713
High	927	0.0417	41.722

99% BANDWIDTH

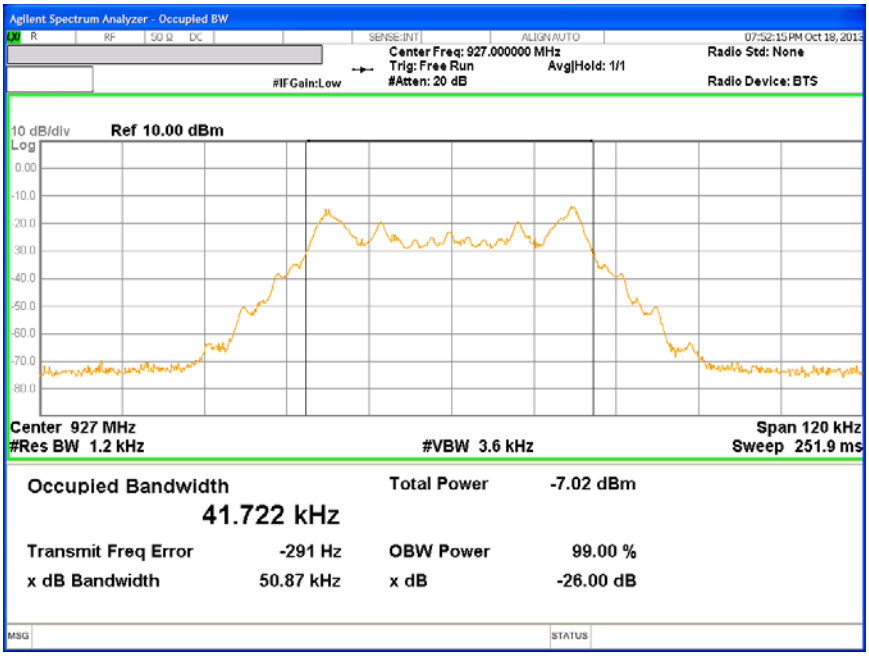
99% BANDWIDTH LOW CH



99% BANDWIDTH MID CH



99% BANDWIDTH HIGH CH



7.2. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

IC RSS-210, A2.9
FCC 15.249

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.
(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

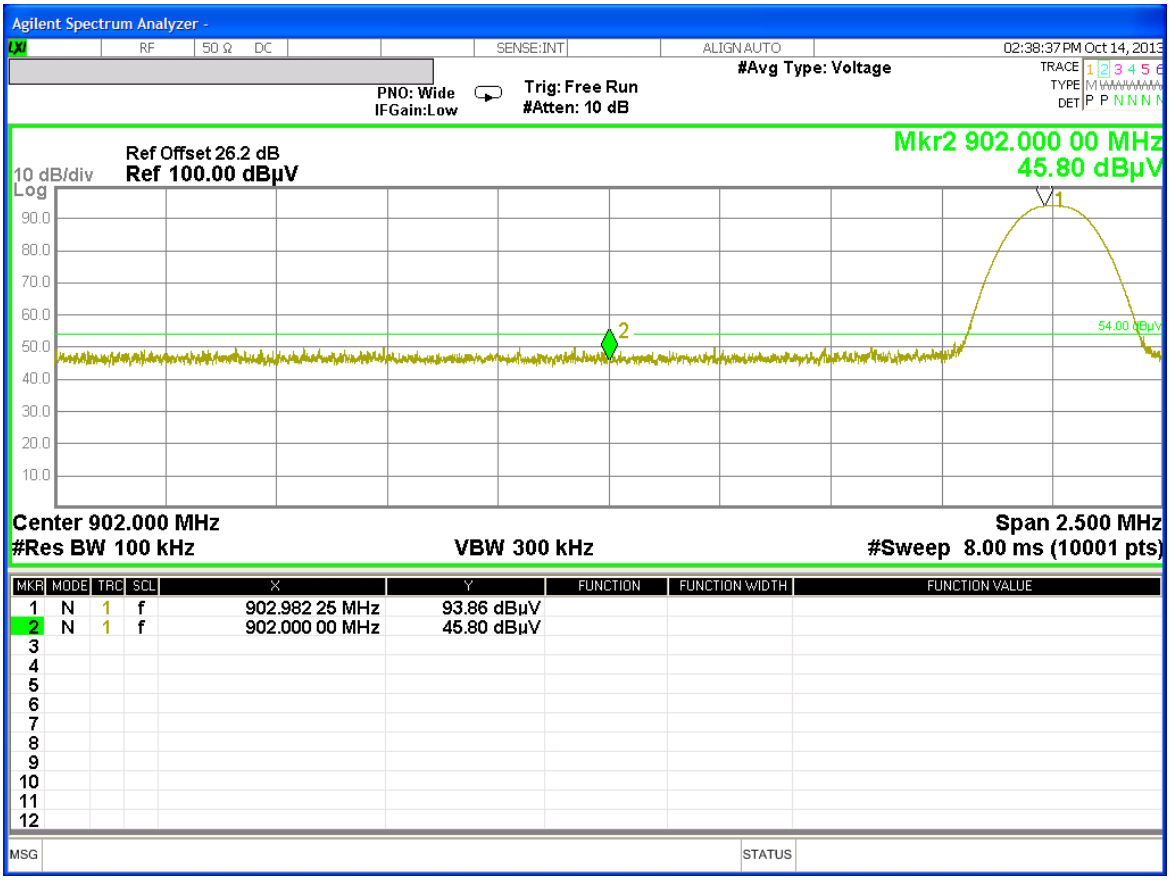
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100 **	3
88–216	150 **	3
216–960	200 **	3
Above 960	500	3

** 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.

RESULTS

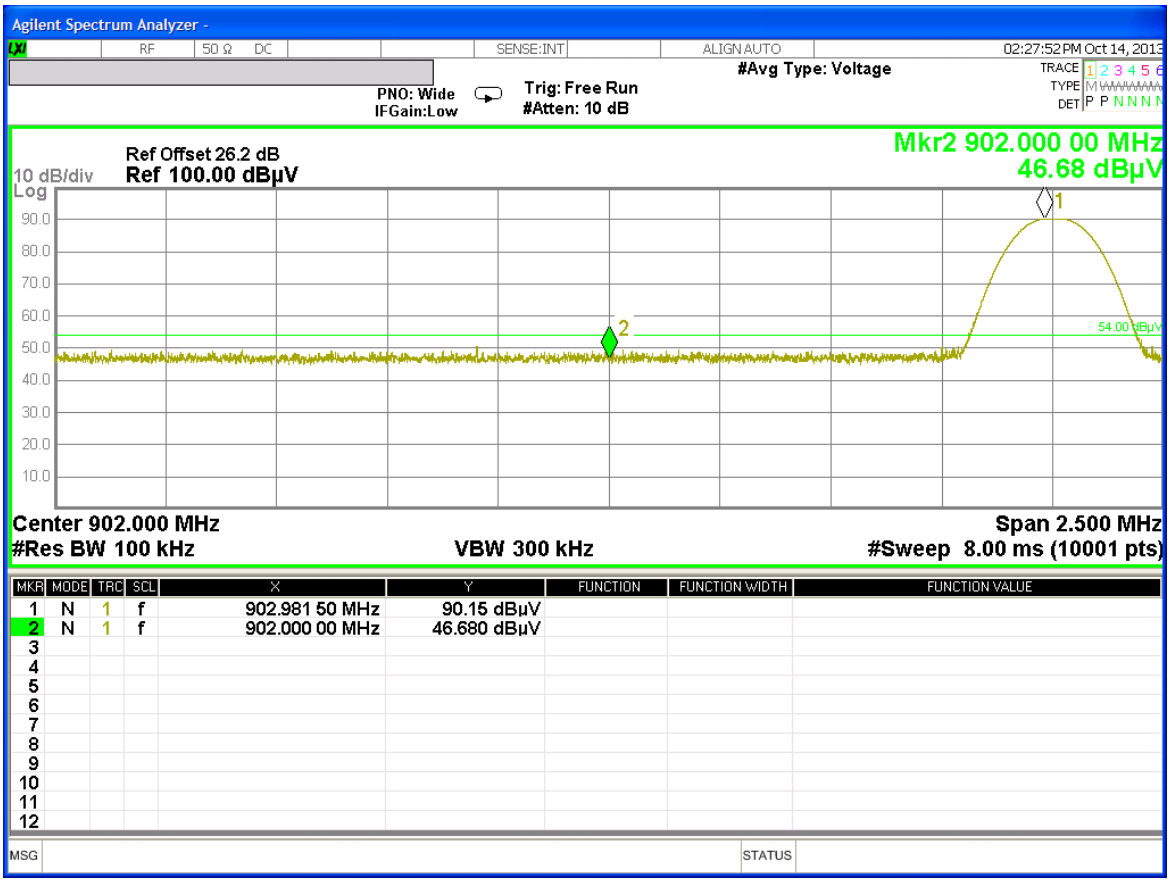
7.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION – RF ADAPTER

LOW CHANNEL: HORIZONTAL

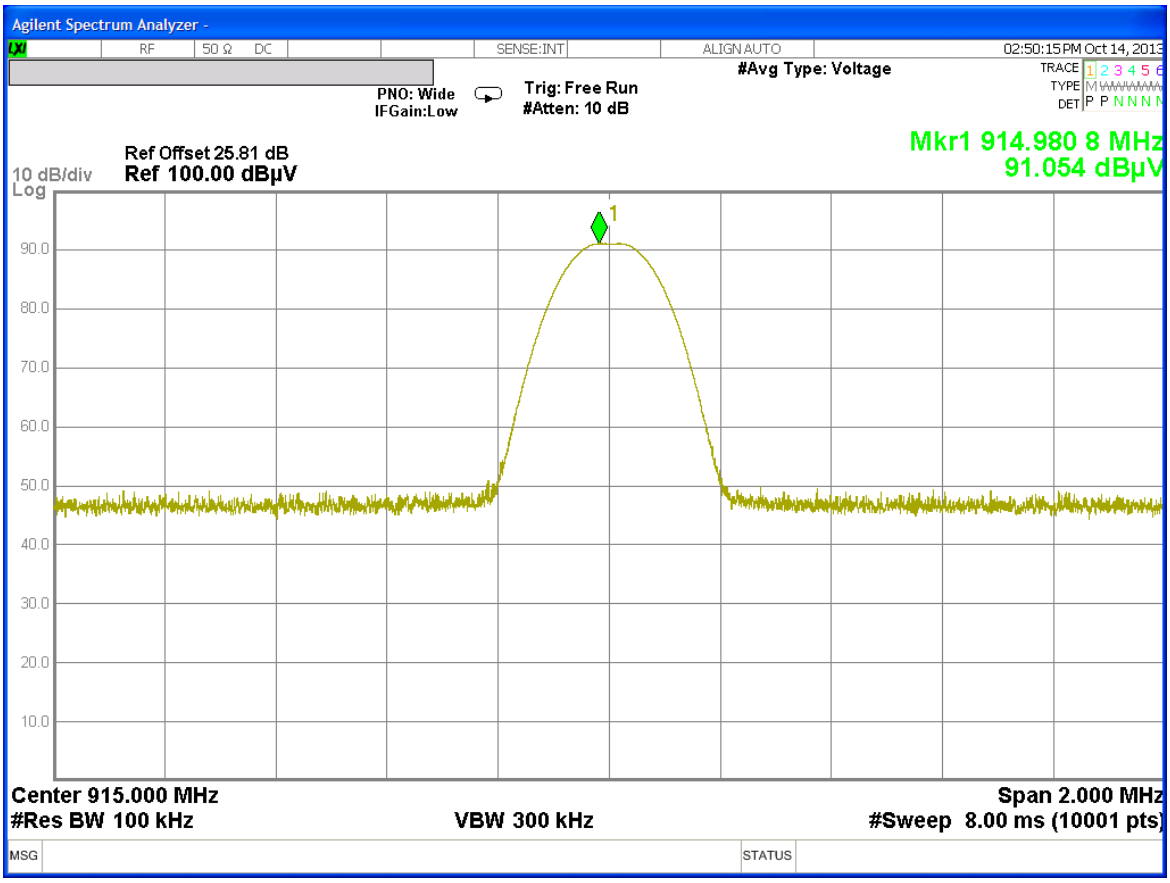


Note: 903MHz fundamental re-measured with a QP detector. Result: 93.73dBuV/m.

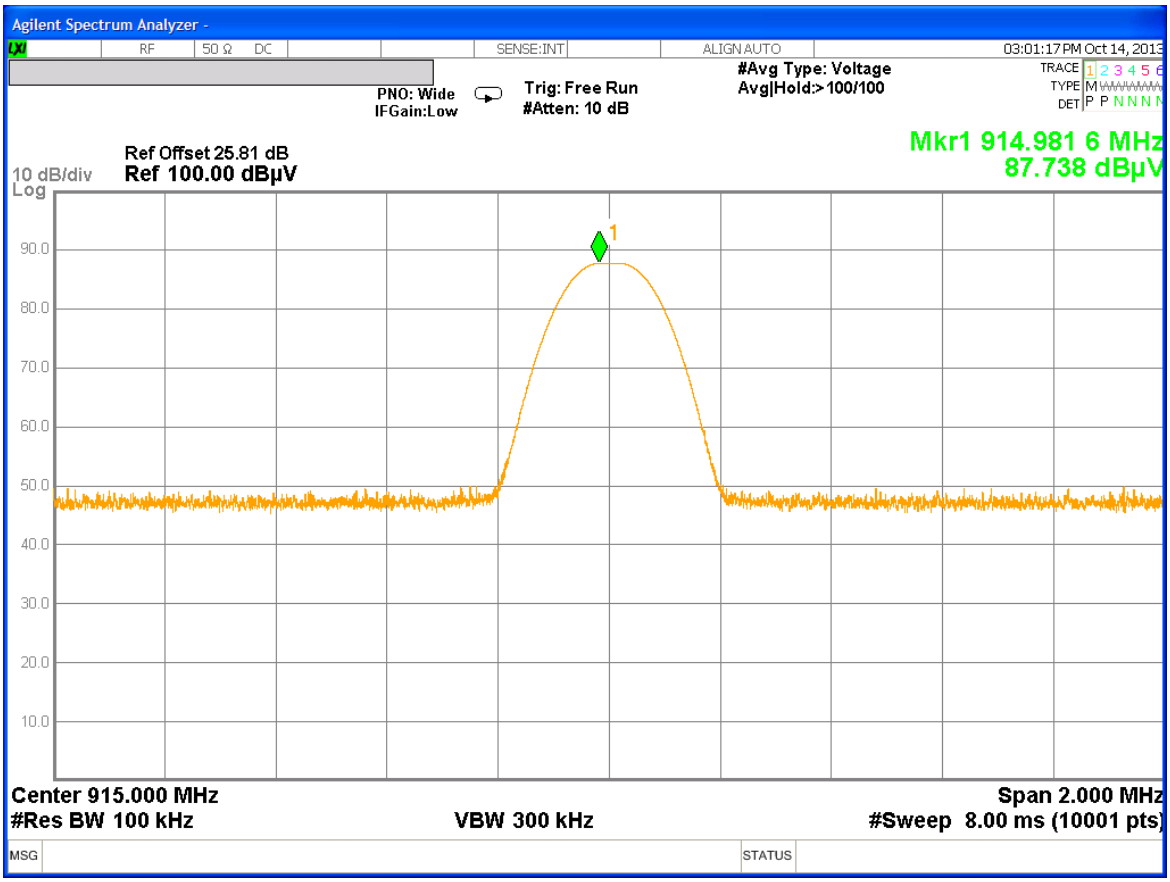
LOW CHANNEL: VERTICAL



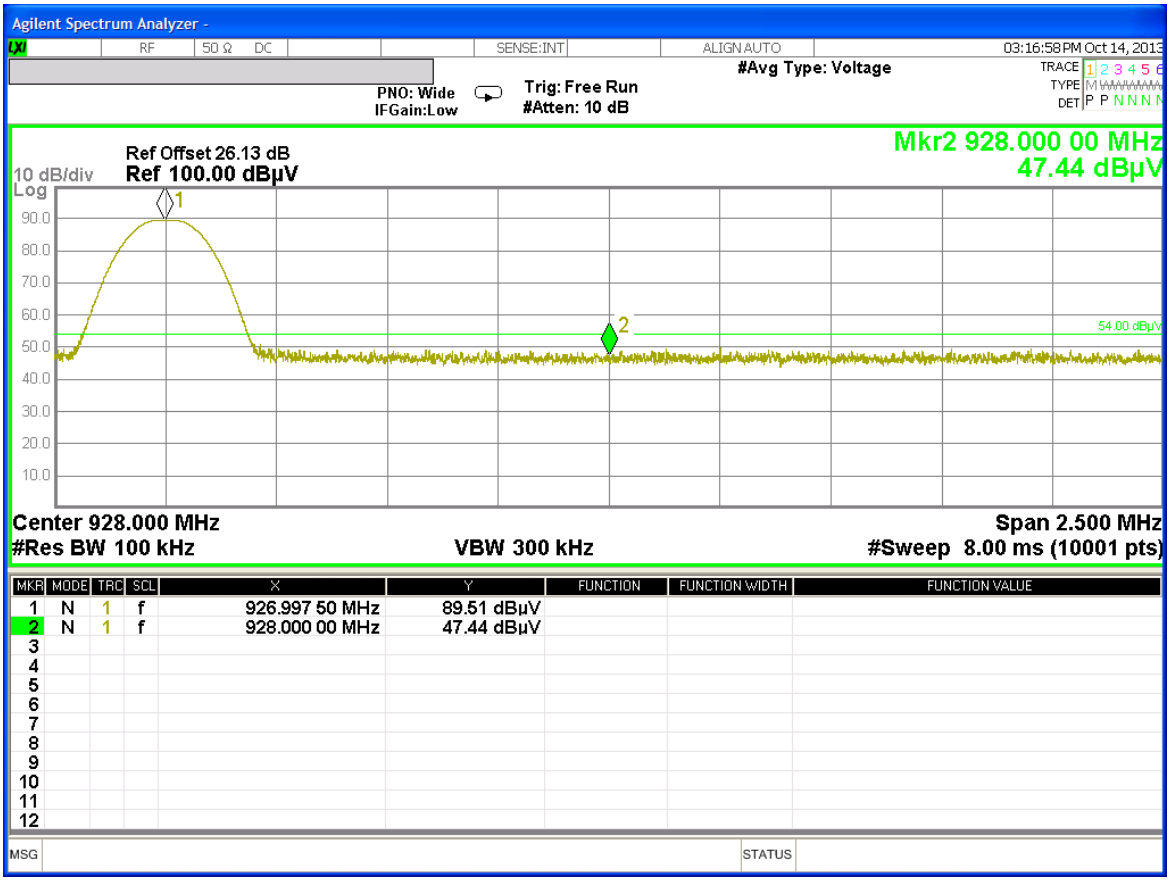
MIDDLE CHANNEL: HORIZONTAL



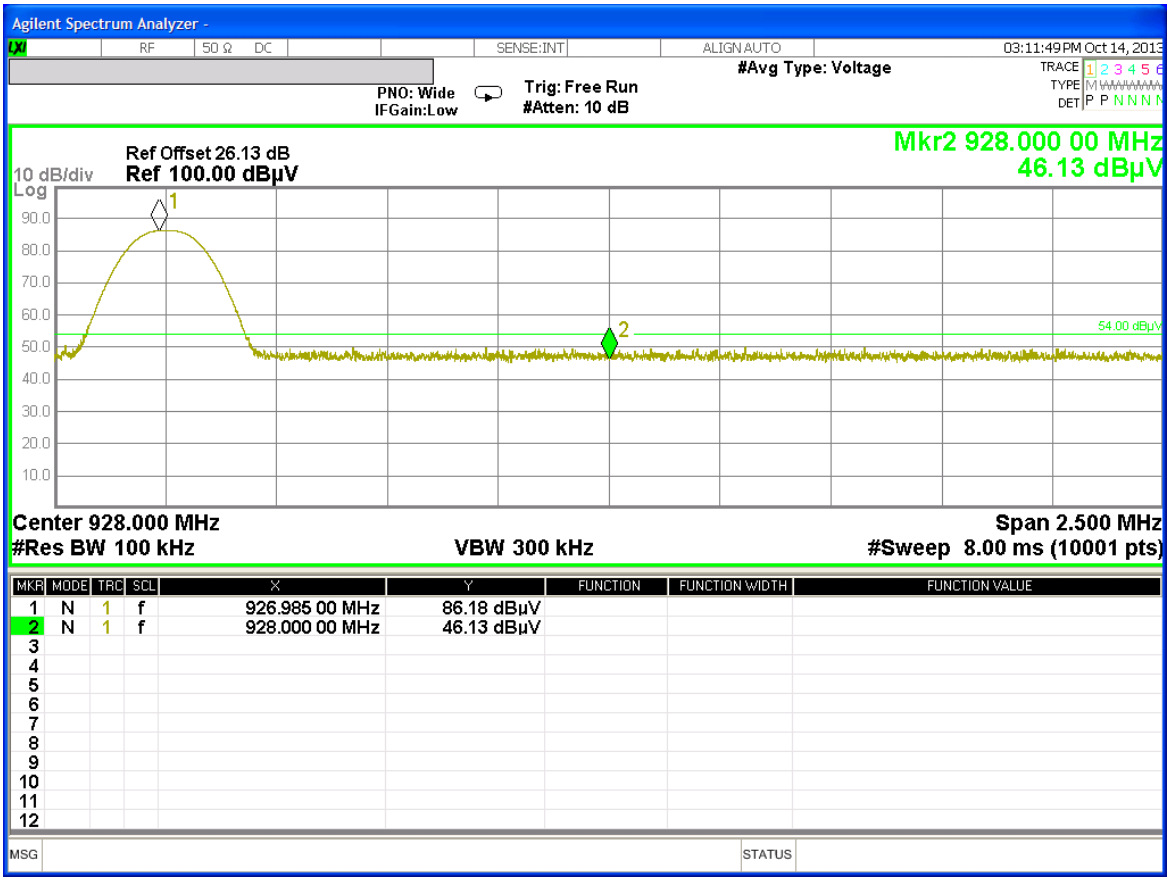
MIDDLE CHANNEL: VERTICAL



HIGH CHANNEL: HORIZONTAL



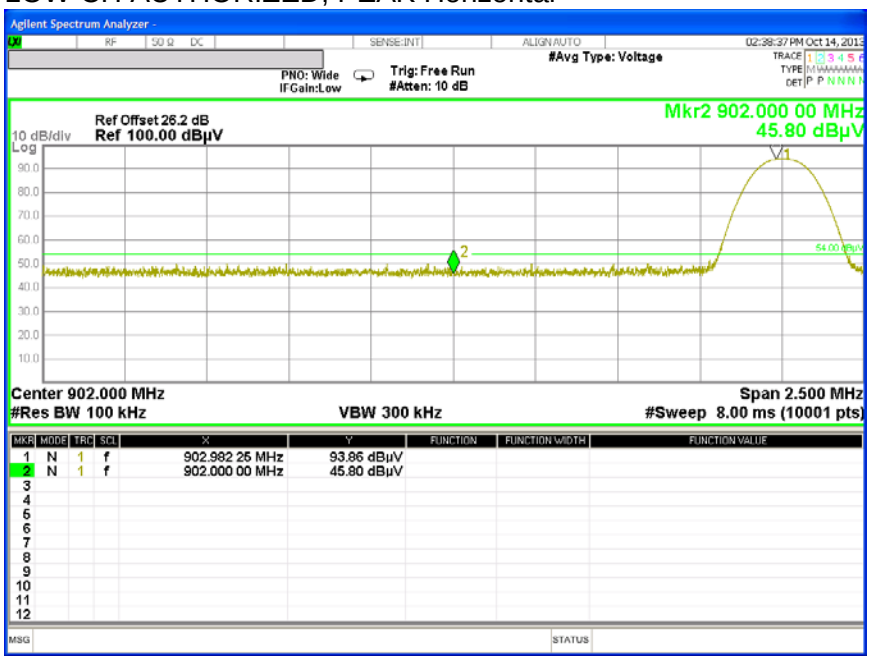
HIGH CHANNEL: VERTICAL



7.2.2. TRANSMITTER AUTHORIZED BAND EDGES – RF ADAPTER

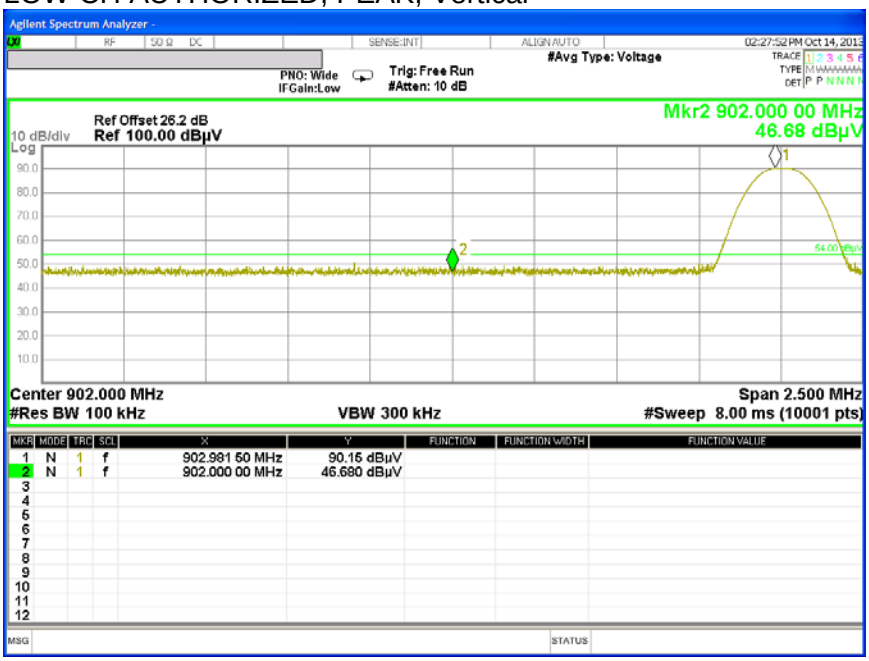
AUTHORIZED BANDEDGE (LOW CHANNEL, HORIZONTAL)

LOW CH AUTHORIZED, PEAK Horizontal



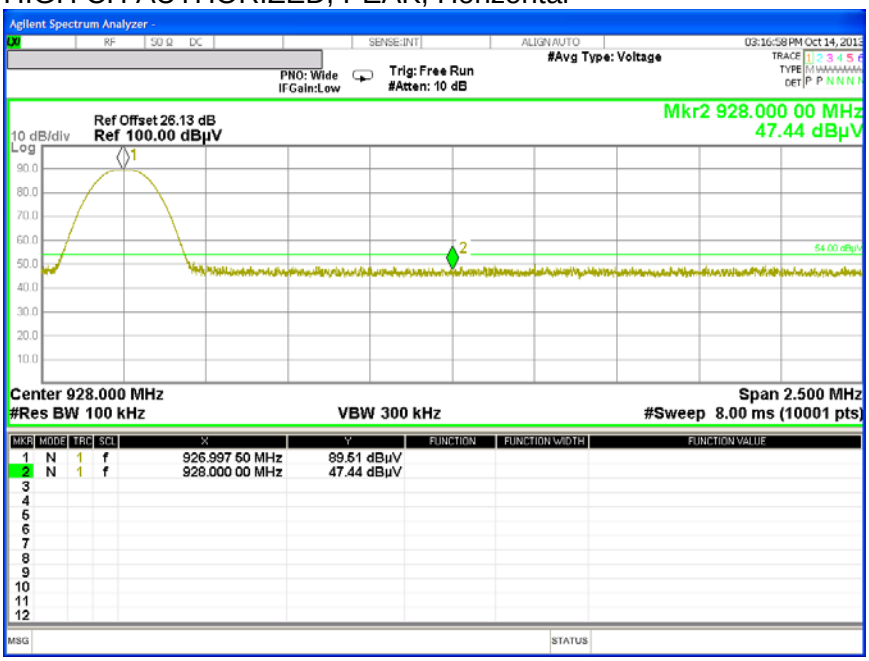
AUTHORIZED BANDEDGE (LOW CHANNEL, VERTICAL)

LOW CH AUTHORIZED, PEAK, Vertical



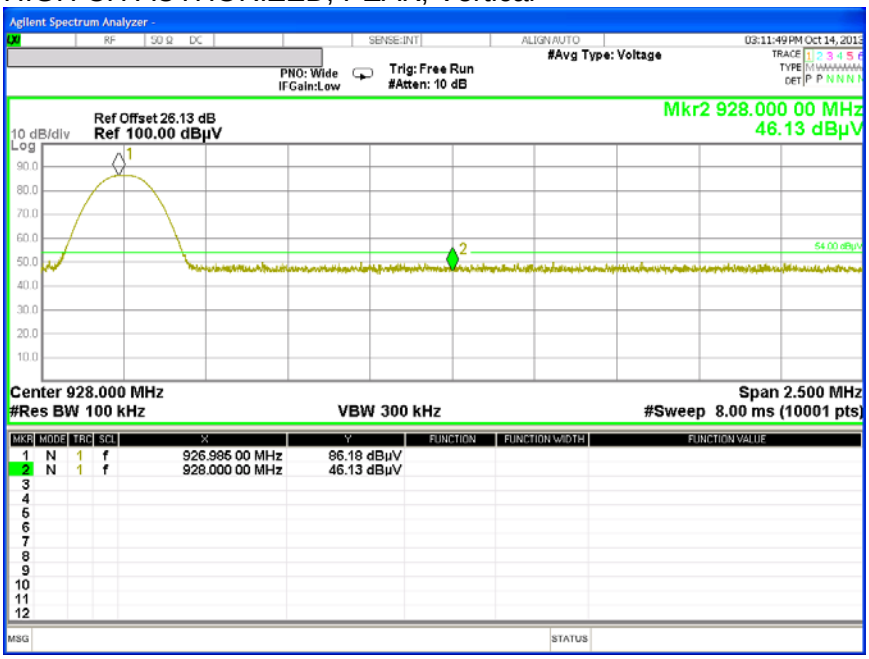
AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CH AUTHORIZED, PEAK, Horizontal



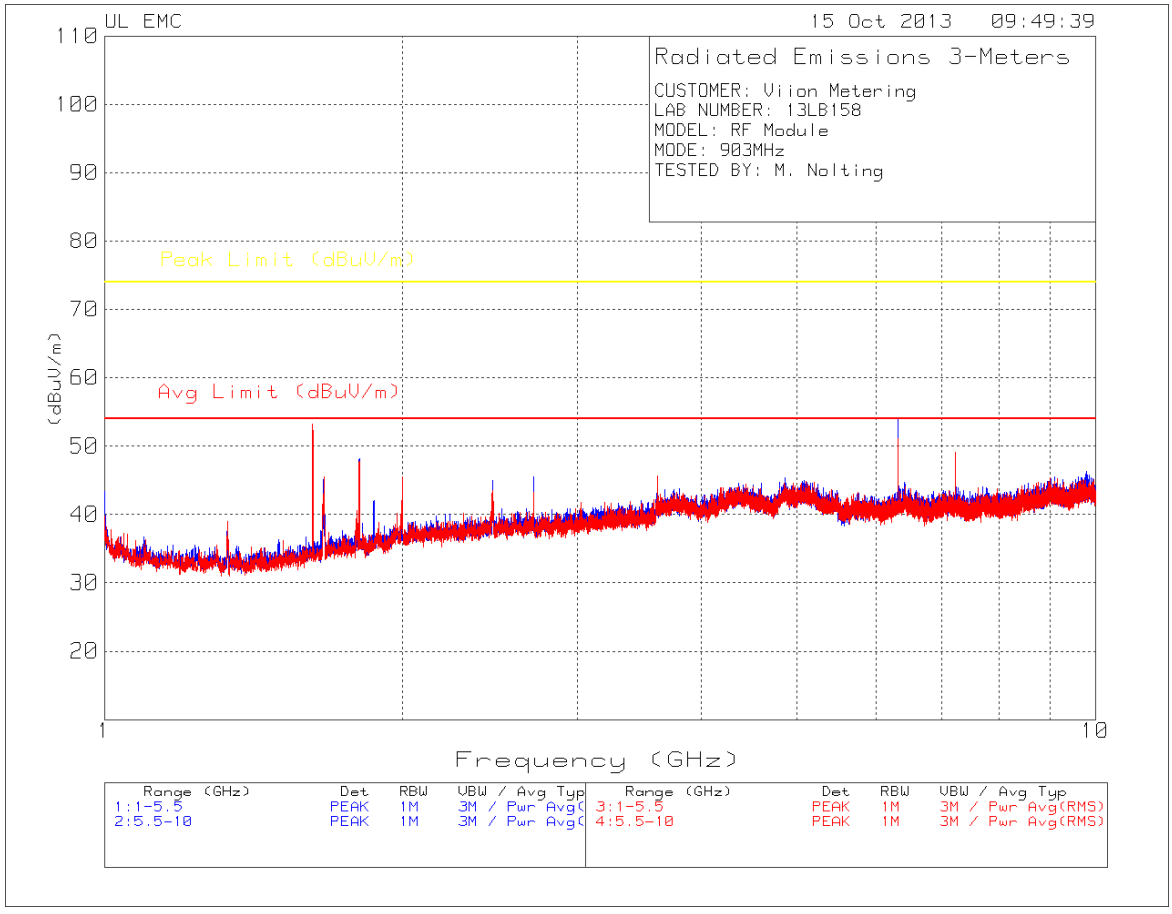
AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CH AUTHORIZED, PEAK, Vertical



7.2.3. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz – RF ADAPTER

LOW CHANNEL: HORIZONTAL/VERTICAL PLOT



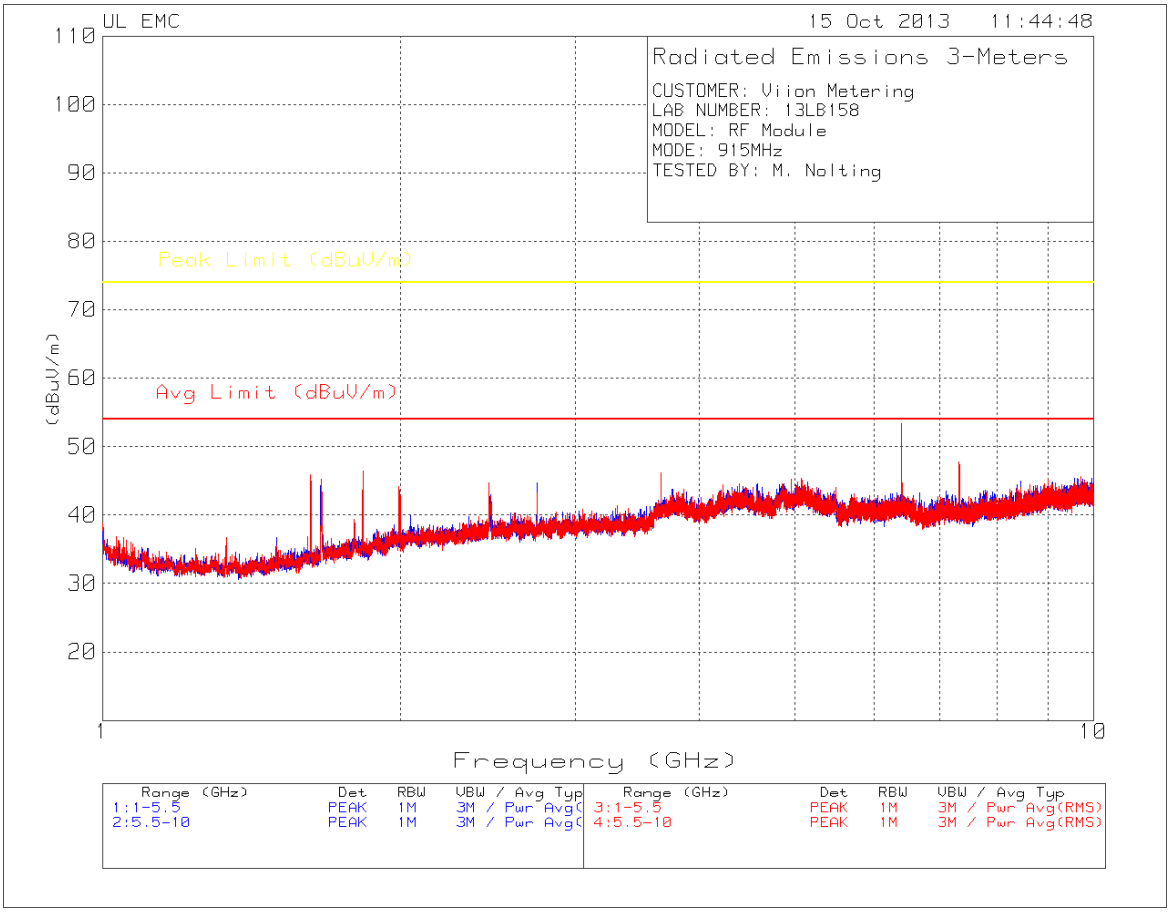
LOW CHANNEL: TABULAR DATA

CUSTOMER: Vision Metering
LAB NUMBER: 13LB158
MODEL: RF Module
MODE: 903MHz
TESTED BY: M. Nolting

Test Frequency [GHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	FCC AV [dBuV/m]	Margin [dB]	FCC PK [dBuV/m]	Margin [dB]	Polarity
1.622	58.30	PK	28.60	-39.40	47.50	54.0	-6.5	74.0	-26.5	H
1.663	55.66	PK	28.90	-39.40	45.16	54.0	-8.8	74.0	-28.8	H
1.807	57.59	PK	30.00	-39.40	48.19	-	-	74.0	-25.8	H
2.710	50.80	PK	32.40	-37.70	45.50	54.0	-8.5	74.0	-28.5	H
3.613	49.23	PK	33.30	-37.30	45.23	54.0	-8.8	74.0	-28.8	H
6.322	51.71	PK	35.40	-33.20	53.91	-	-	74.0	-20.1	H
7.225	44.51	PK	35.70	-32.90	47.31	54.0	-6.7	74.0	-26.7	H
1.806	56.40	VB10	30.00	-39.40	47.00	54.0	-7.0	-	-	H
6.321	49.80	VB10	35.40	-33.20	52.00	54.0	-2.0	-	-	H
6.321	49.54	VB10	35.40	-33.20	51.74	54.0	-2.3	-	-	H
1.622	64.07	PK	28.60	-39.40	53.27	-	-	74.0	-20.7	V
1.665	56.06	PK	28.90	-39.40	45.56	54.0	-8.4	74.0	-28.4	V
1.806	57.05	PK	30.00	-39.40	47.65	54.0	-6.4	74.0	-26.4	V
1.999	53.27	PK	31.50	-39.20	45.57	54.0	-8.4	74.0	-28.4	V
2.710	48.48	PK	32.40	-37.70	43.18	54.0	-10.8	74.0	-30.8	V
3.613	49.62	PK	33.30	-37.30	45.62	54.0	-8.4	74.0	-28.4	V
6.322	48.86	PK	35.40	-33.20	51.06	-	-	74.0	-22.9	V
7.224	46.32	PK	35.70	-32.90	49.12	-	-	74.0	-24.9	V
1.620	57.20	VB10	28.60	-39.40	46.40	54.0	-7.6	-	-	V
6.321	49.04	VB10	35.40	-33.20	51.24	54.0	-2.8	-	-	V
7.224	45.65	VB10	35.70	-32.90	48.45	54.0	-5.6	-	-	V

*PK: Peak Detector
*VB10Hz: 1MHz RBW, 10Hz VBW

MIDDLE CHANNEL: HORIZONTAL/VERTICAL PLOT



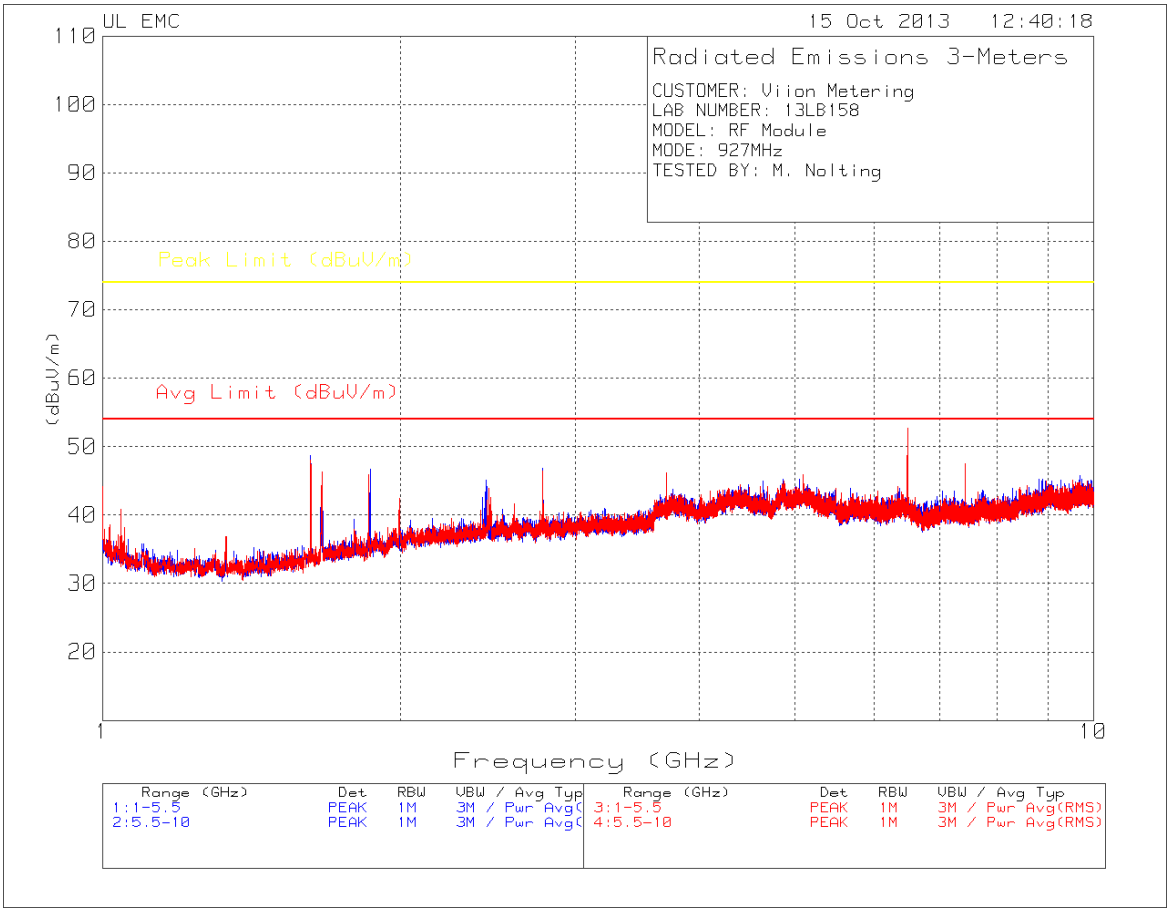
MIDDLE CHANNEL: TABULAR DATA

CUSTOMER: Vision Metering
LAB NUMBER: 13LB158
MODEL: RF Module
MODE: 915MHz
TESTED BY: M. Nolting

Test Frequency [GHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	FCC AV [dBuV/m]	Margin [dB]	FCC PK [dBuV/m]	Margin [dB]	Polarity
1.622	56.60	PK	28.60	-39.40	45.80	54.0	-8.2	74.0	-28.2	H
1.660	55.55	PK	28.90	-39.40	45.05	54.0	-9.0	74.0	-29.0	H
1.831	55.18	PK	30.20	-39.40	45.98	54.0	-8.0	74.0	-28.0	H
2.458	48.78	PK	32.00	-38.10	42.68	54.0	-11.3	74.0	-31.3	H
2.746	50.02	PK	32.40	-37.70	44.72	54.0	-9.3	74.0	-29.3	H
3.661	48.88	PK	33.30	-37.20	44.98	54.0	-9.0	74.0	-29.0	H
6.406	49.91	PK	35.50	-33.00	52.41	-	-	74.0	-21.6	H
7.321	42.69	PK	35.60	-32.70	45.59	54.0	-8.4	74.0	-28.4	H
6.405	50.34	VB10	35.50	-33.00	52.84	54.0	-1.2	-	-	H
1.622	56.75	PK	28.60	-39.40	45.95	54.0	-8.1	74.0	-28.1	V
1.661	55.72	PK	28.90	-39.40	45.22	54.0	-8.8	74.0	-28.8	V
1.831	55.67	PK	30.20	-39.40	46.47	54.0	-7.5	74.0	-27.5	V
2.452	50.80	PK	32.00	-38.10	44.70	54.0	-9.3	74.0	-29.3	V
2.746	48.59	PK	32.40	-37.70	43.29	54.0	-10.7	74.0	-30.7	V
3.661	50.07	PK	33.30	-37.20	46.17	54.0	-7.8	74.0	-27.8	V
6.406	50.81	PK	35.50	-33.00	53.31	-	-	74.0	-20.7	V
7.321	44.81	PK	35.60	-32.70	47.71	54.0	-6.3	74.0	-26.3	V
6.405	50.25	VB10	35.50	-33.00	52.75	54.0	-1.3	-	-	V

*PK: Peak Detector
*VB10Hz: 1MHz RBW, 10Hz VBW

HIGH CHANNEL: HORIZONTAL/VERTICAL PLOT



HIGH CHANNEL: TABULAR DATA

CUSTOMER: Vision Metering
LAB NUMBER: 13LB158
MODEL: RF Module
MODE: 927MHz
TESTED BY: M. Nolting

Test Frequency [GHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	FCC AV [dBuV/m]	Margin [dB]	FCC PK [dBuV/m]	Margin [dB]	Polarity
1.622	59.44	PK	28.60	-39.40	48.64	-	-	74.0	-25.4	H
1.662	53.91	PK	28.90	-39.40	43.41	54.0	-10.6	74.0	-30.6	H
1.855	54.59	PK	30.40	-39.40	45.59	54.0	-8.4	74.0	-28.4	H
1.862	55.59	PK	30.50	-39.40	46.69	54.0	-7.3	74.0	-27.3	H
2.440	51.31	PK	32.00	-38.20	45.11	54.0	-8.9	74.0	-28.9	H
2.782	52.13	PK	32.50	-37.80	46.83	54.0	-7.2	74.0	-27.2	H
3.709	47.26	PK	33.30	-37.20	43.36	54.0	-10.6	74.0	-30.6	H
6.490	48.75	PK	35.60	-32.90	51.45	-	-	74.0	-22.6	H
7.417	42.58	PK	35.60	-32.60	45.58	54.0	-8.4	74.0	-28.4	H
1.621	52.94	VB10	28.60	-39.40	42.14	54.0	-11.9	-	-	H
6.489	50.29	VB10	35.60	-32.90	52.99	54.0	-1.0	-	-	H
1.622	58.81	PK	28.60	-39.40	48.01	54.0	-6.0	74.0	-26.0	V
1.666	56.74	PK	28.90	-39.40	46.24	54.0	-7.8	74.0	-27.8	V
1.855	54.85	PK	30.40	-39.40	45.85	54.0	-8.2	74.0	-28.2	V
1.993	50.11	PK	31.50	-39.20	42.41	54.0	-11.6	74.0	-31.6	V
2.453	50.04	PK	32.00	-38.10	43.94	54.0	-10.1	74.0	-30.1	V
2.782	51.69	PK	32.50	-37.80	46.39	54.0	-7.6	74.0	-27.6	V
3.709	50.01	PK	33.30	-37.20	46.11	54.0	-7.9	74.0	-27.9	V
6.490	50.01	PK	35.60	-32.90	52.71	54.0	-1.3	74.0	-21.3	V
7.417	44.55	PK	35.60	-32.60	47.55	54.0	-6.5	74.0	-26.5	V
6.489	50.76	VB10	35.60	-32.90	53.46	54.0	-0.5	-	-	V

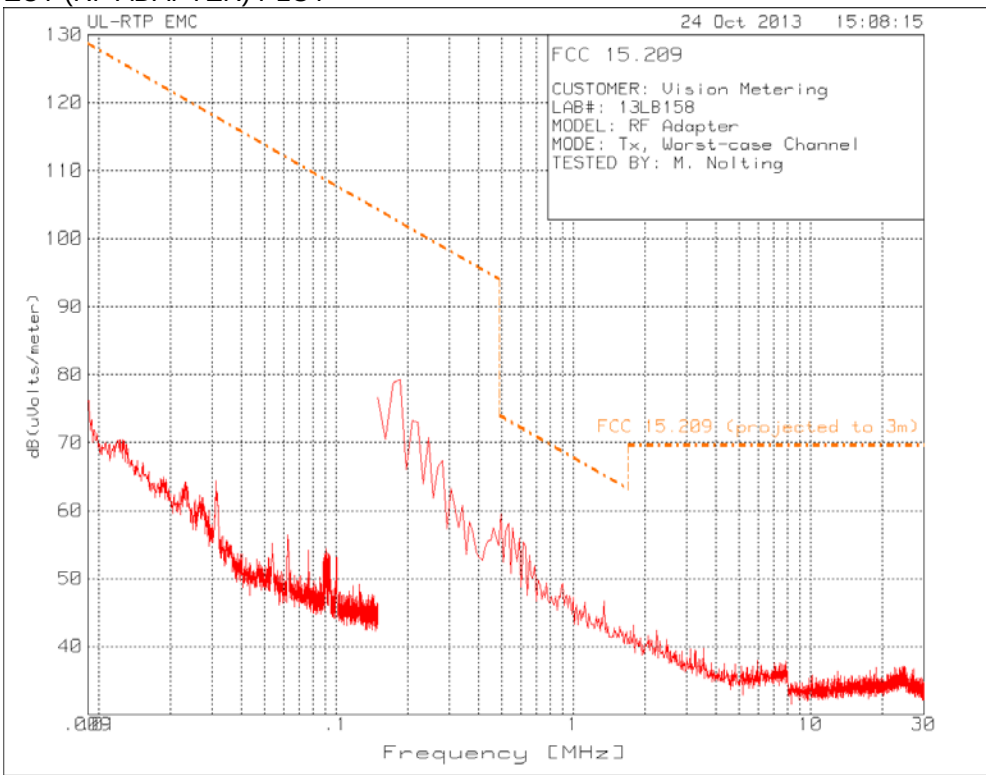
*PK: Peak Detector
*VB10Hz: 1MHz RBW, 10Hz VBW

7.2.4. WORST-CASE BELOW 1 GHz – RF ADAPTER

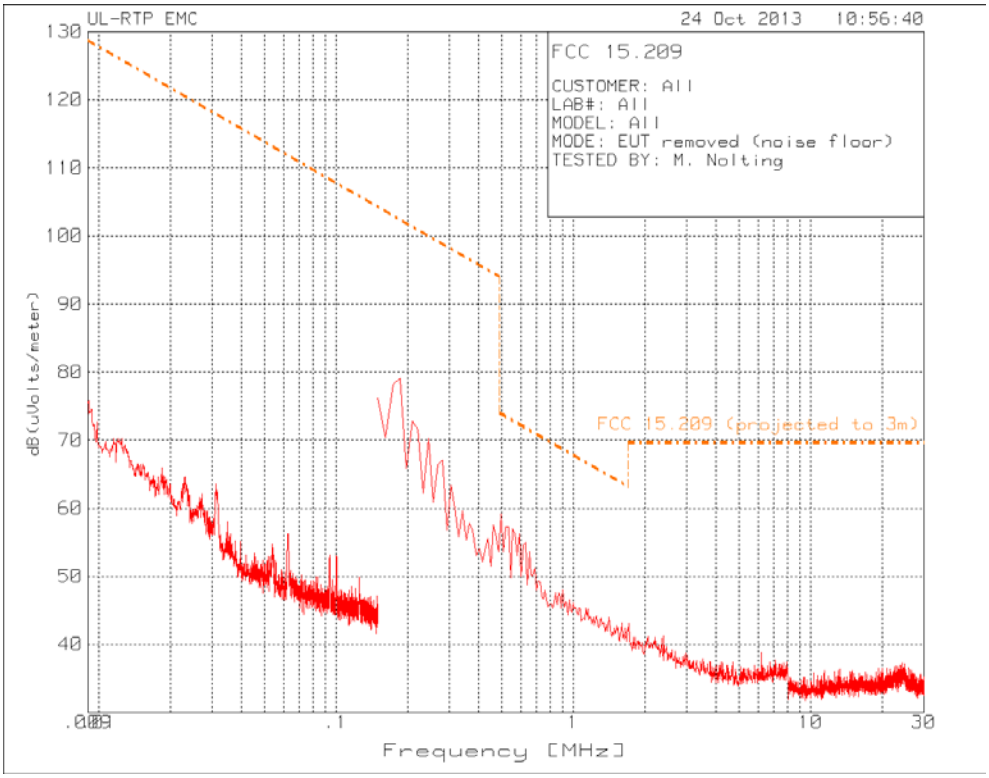
SPURIOUS EMISSIONS BELOW 30 MHz

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).

EUT (RF ADAPTER) PLOT



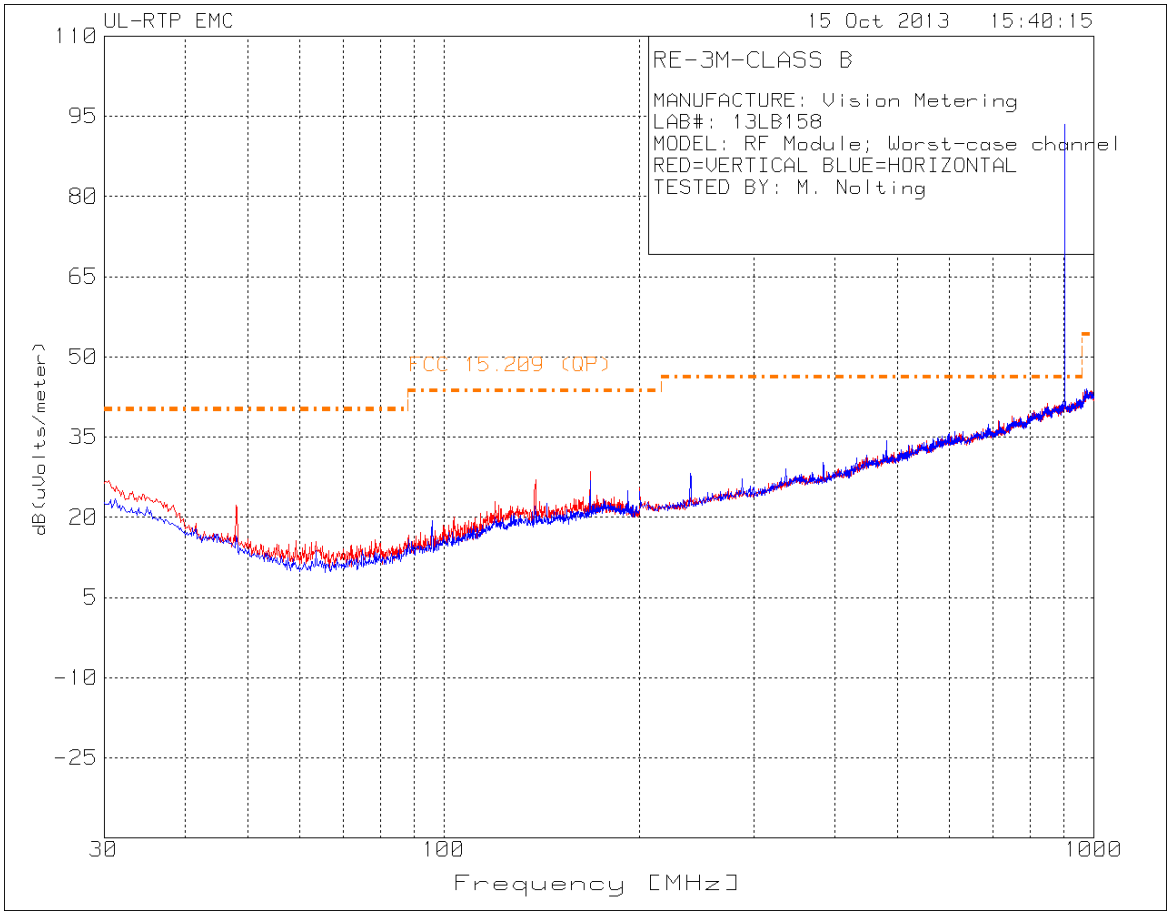
NOISE-FLOOR PLOT



The above plots demonstrate there were no EUT-related emissions of interest relative to the FCC 15.209 limit below 30MHz.

SPURIOUS EMISSIONS 30 TO 1000 MHz

VERTICAL/HORIZONTAL PLOT



TABULAR DATA

MANUFACTURE: Vision Metering
LAB#: 13LB158
MODEL: RF Module; Worst-case channel
RED=VERTICAL BLUE=HORIZONTAL
TESTED BY: M. Nolting

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	Antenna [dB/m]	Gain/Loss [dB]	Field Strength [dBuV/m]	FCC 15.249 Limit [dBuV/m]	Margin [dB]	Polarity
168.008	35.33	PK	14.80	-23.20	26.93	43.5	-16.6	H
192.172	32.70	PK	15.20	-22.90	25.00	43.5	-18.5	H
239.493	45.21	PK	11.30	-28.30	28.21	46.0	-17.8	H
479.653	43.74	PK	17.20	-26.60	34.34	46.0	-11.7	H
48.038	35.78	PK	10.10	-24.10	21.78	40.0	-18.2	V
138.569	36.37	PK	14.20	-23.60	26.97	43.5	-16.5	V
168.008	36.95	PK	14.80	-23.20	28.55	43.5	-15.0	V

*PK = Peak, QP = Quasi-Peak

8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

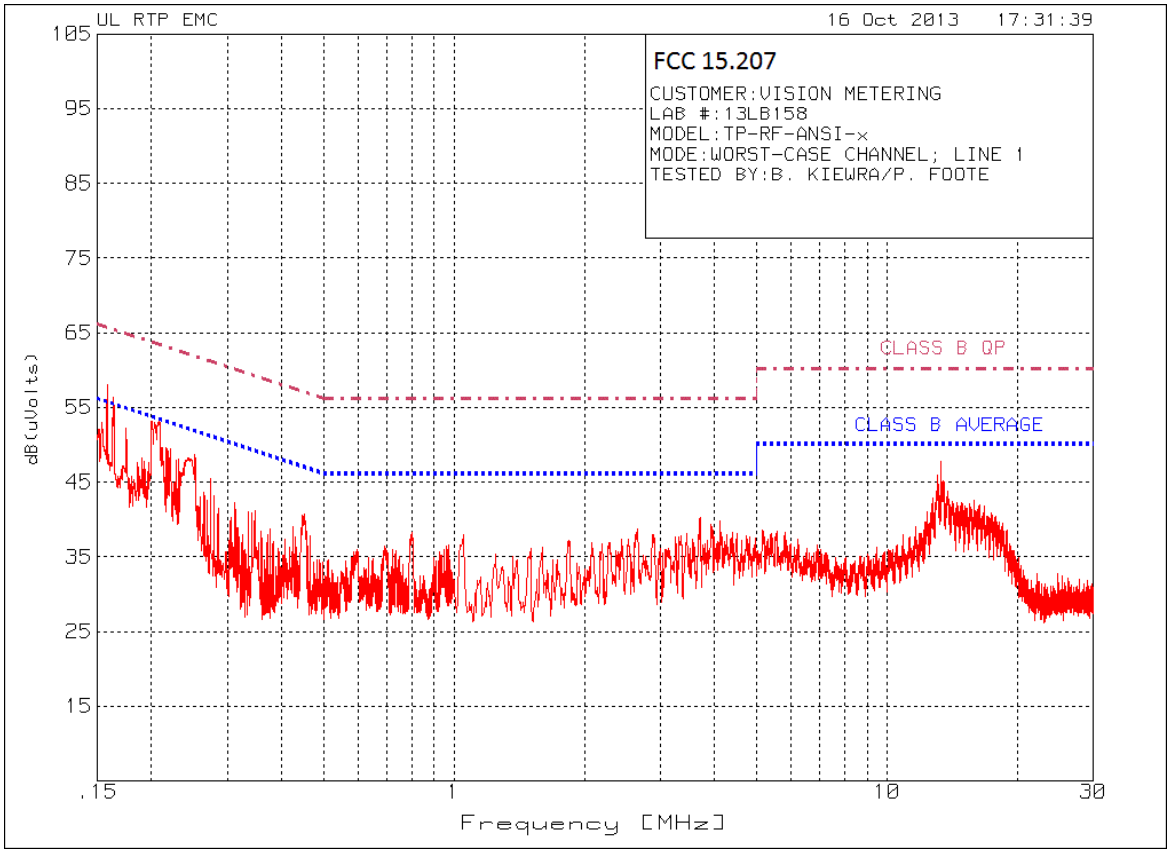
TEST PROCEDURE

ANSI C63.4

RESULTS

LINE 1 RESULTS

LINE 1 AC LINE PLOT



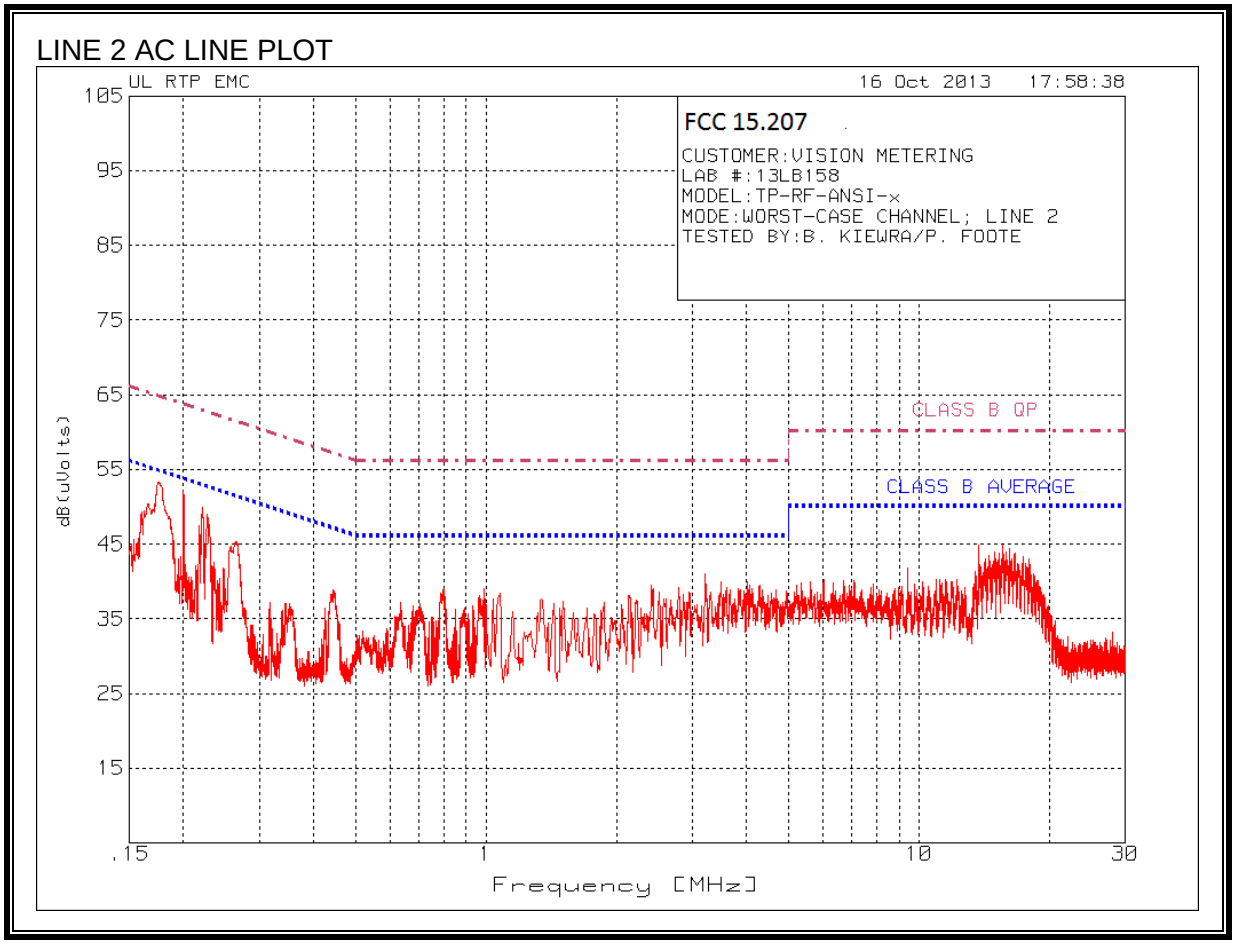
LINE 1 AC TABULAR DATA

CUSTOMER:VISION METERING
LAB #:13LB158
MODEL:TP-RF-ANSI-x
MODE: WORST-CASE CHANNEL; LINE 1
TESTED BY:B. KIEWRA/P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
0.158	48.43	PK	0.40	9.30	58.13	65.6	-7.5	-	-
0.163	46.76	PK	0.30	9.30	56.36	65.3	-8.9	-	-
0.175	42.67	PK	0.30	9.30	52.27	64.7	-12.4	-	-
0.200	43.61	PK	0.30	9.30	53.21	63.6	-10.4	-	-
0.209	43.53	PK	0.20	9.30	53.03	63.2	-10.2	-	-
0.222	39.96	PK	0.20	9.30	49.46	62.8	-13.3	-	-
0.231	38.52	PK	0.20	9.30	48.02	62.4	-14.4	-	-
0.252	39.18	PK	0.20	9.30	48.68	61.7	-13.0	-	-
0.274	35.94	PK	0.20	9.30	45.44	61.0	-15.6	-	-
0.452	31.34	PK	0.10	9.30	40.74	56.8	-16.1	-	-
3.712	30.51	PK	0.10	9.40	40.01	56.0	-16.0	-	-
13.338	38.02	PK	0.10	9.60	47.72	60.0	-12.3	-	-
0.161	25.97	CAV	0.40	9.30	35.67	-	-	55.4	-19.7
0.162	25.57	CAV	0.40	9.30	35.27	-	-	55.4	-20.1
0.166	27.07	CAV	0.30	9.30	36.67	-	-	55.2	-18.5
0.197	16.04	CAV	0.30	9.30	25.64	-	-	53.7	-28.1
0.211	11.98	CAV	0.20	9.30	21.48	-	-	53.2	-31.7
0.220	10.78	CAV	0.20	9.30	20.28	-	-	52.8	-32.6
0.226	9.78	CAV	0.20	9.30	19.28	-	-	52.6	-33.3
0.260	20.19	CAV	0.20	9.30	29.69	-	-	51.4	-21.8
0.265	21.37	CAV	0.20	9.30	30.87	-	-	51.3	-20.4
0.444	23.73	CAV	0.10	9.30	33.13	-	-	47.0	-13.9
3.709	15.96	CAV	0.10	9.40	25.46	-	-	46.0	-20.5
13.338	21.62	CAV	0.10	9.60	31.32	-	-	50.0	-18.7

*PK = Peak, QP = Quasi-Peak, CAV = CISPR-compliant average

LINE 2 RESULTS



LINE 2 AC TABULAR DATA

CUSTOMER:VISION METERING
LAB #:13LB158
MODEL:TP-RF-ANSI-x
MODE: WORST-CASE CHANNEL; LINE 2
TESTED BY:B. KIEWRA/P. FOOTE

Test Frequency [MHz]	Meter Reading [dBuV]	Detector*	LISN [dB]	Cable Loss [dB]	RF Line Voltage [dBuV]	FCC 15.207 (QP) [dBuV]	Margin [dB]	FCC 15.207 (AV) [dBuV]	Margin [dB]
0.175	43.70	PK	0.30	9.30	53.30	64.7	-11.4	-	-
0.200	42.43	PK	0.30	9.30	52.03	63.6	-11.6	-	-
0.221	40.39	PK	0.20	9.30	49.89	62.8	-12.9	-	-
0.227	39.55	PK	0.20	9.30	49.05	62.5	-13.5	-	-
0.264	35.87	PK	0.20	9.30	45.37	61.3	-15.9	-	-
3.208	31.51	PK	0.10	9.40	41.01	56.0	-15.0	-	-
13.756	35.15	PK	0.10	9.60	44.85	60.0	-15.2	-	-
15.610	35.00	PK	0.20	9.60	44.80	60.0	-15.2	-	-
16.207	34.63	PK	0.20	9.60	44.43	60.0	-15.6	-	-
0.177	20.29	CAV	0.30	9.30	29.89	-	-	54.6	-24.8
0.193	22.46	CAV	0.30	9.30	32.06	-	-	53.9	-21.9
0.217	14.08	CAV	0.20	9.30	23.58	-	-	52.9	-29.4
0.221	11.82	CAV	0.20	9.30	21.32	-	-	52.8	-31.5
0.270	16.02	CAV	0.20	9.30	25.52	-	-	51.1	-25.6
3.212	19.79	CAV	0.10	9.40	29.29	-	-	46.0	-16.7
13.754	18.92	CAV	0.10	9.60	28.62	-	-	50.0	-21.4
15.613	20.58	CAV	0.20	9.60	30.38	-	-	50.0	-19.6
16.205	20.84	CAV	0.20	9.60	30.64	-	-	50.0	-19.4

*PK = Peak, QP = Quasi-Peak, CAV = CISPR-compliant average

END OF REPORT